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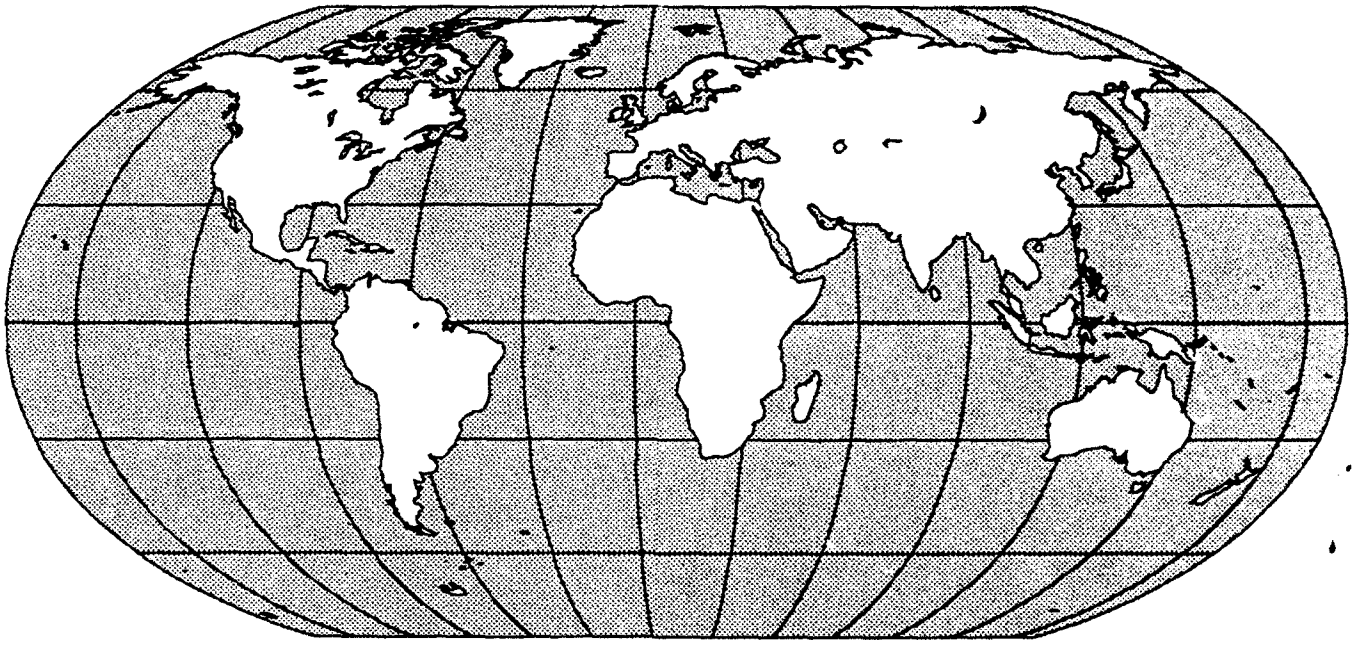
1992 Worldwide Survey
of Substance Abuse and Health Behaviors Among Military Personnel



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The report presents the results of the 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel. This is the fifth in a series of surveys of military personnel conducted in 1980, 1982, 1985, 1988, and 1992 under the direction of the Department of Defense. All the surveys investigated the prevalence of alcohol use, illicit drug use, tobacco use, the consequences of alcohol use and the consequences of drug use. The 1985 and 1988 surveys also examined health behaviors other than substance use on the quality of life of military personnel. In 1992, the survey was expanded to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition. In addition, in the 1992 survey, the impact of Operation Desert Shield/Desert Storm on substance use rates was examined; included questions to assess problem gambling in the military; gathered information to estimate medical costs associated with heavy cigarette smoking and drinking among active duty personnel; and made extensive comparisons with national survey data.

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1992 Worldwide Survey

of Substance Abuse and Health Behaviors
Among Military Personnel

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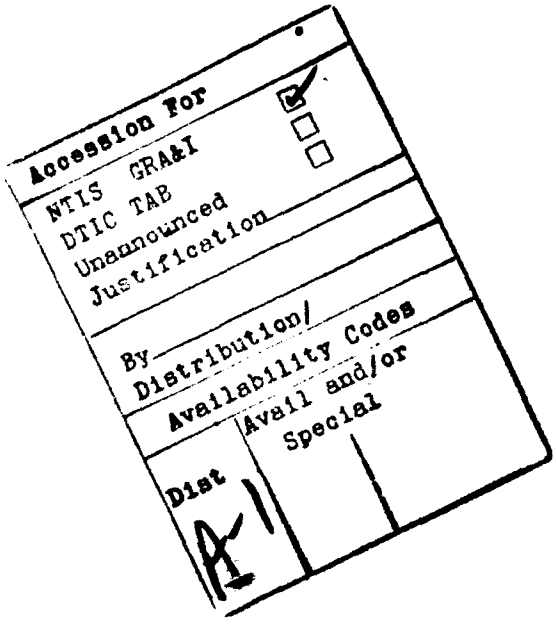

PREFACE AND ACKNOWLEDGEMENTS

The 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel was conducted by the Research Triangle Institute (RTI) under the sponsorship of the Department of Defense. The survey is the fifth in a series of Worldwide Surveys conducted since 1980; it provides comprehensive and detailed estimates of the prevalence of use of alcohol, drugs, and tobacco as well as the negative consequences of alcohol and drug abuse among active duty military personnel. The study also examines the prevalence of health behaviors, knowledge and beliefs about AIDS, medical costs associated with heavy alcohol use and heavy smoking, effects of Operations Desert Shield and Desert Storm on substance use, and pathological gambling in the military.

Many individuals contributed to the success of this study. Among DoD and military Services personnel, special appreciation is due Navy Commander Ralph Bally, the Contracting Officer's Representative, who provided valuable guidance throughout the study. Excellent liaison between DoD, RTI and the Services was provided by Major Linda Money for the Army, Dr. David Blank for the Navy, Major Denny Keller for the Marine Corps, and Lieutenant Colonel Wanda Sutterer for the Air Force. We also gratefully acknowledge the efforts of the four Service centers that provided programming and data processing support for personnel sample selection. The cooperation of installation commanders, both for the pilot test and the main survey, and the assistance and courtesies provided by the Military Liaison Officers, who coordinated the activities of the data collection teams, were essential for the successful completion of this effort. Finally, we extend our appreciation to the participating Service members whose responses made this effort possible.

Barry S. Brown of the National Institute on Drug Abuse provided access to the data from the 1991 National Household Survey on Drug Abuse and Owen Thornberry, Jr., of the National Center for Health Statistics provided access to the AIDS Knowledge and Attitudes data from the 1990 National Health Interview Survey. Under subcontract to RTI, Mr. B. Steven Davis and the staff of CTB Macmillan/ McGraw-Hill assisted with the production and scoring of questionnaires. They printed, shipped, received, and optically scanned the survey questionnaires and constructed the raw data file for the analysis.

Many staff members in addition to the report authors of the Research Triangle Institute contributed significantly to the success of this project by composing the questionnaire, coordinating data collection activities, tabulating data, completing various data processing tasks, and typing the manuscript. In particular, S. Randall Keesling led the data collection task; L. Lynn Guess led the effort to develop the 1992 questionnaire; Gary A. Zarkin and David H. Galinis worked on the cost analysis task; and Gayle S.

Bieler, Syamala Kasichainula, Melodie A. Rush, Robert E. Mason, Zhang Ying, and Doris M. Leaston assisted with data analysis, table production, graphics production, and report preparation. J. Valley Rachal, Director of the Center for Social Research and Policy Analysis, provided direction, support, and encouragement throughout the project. Members of the RTI field teams are commended for accomplishing their data collection tasks under rigorous travel and scheduling demands. Finally, thanks are due Erin O. Newton, Beryl C. Pittman, and Elizabeth D. MacDonald, who edited the report, and to Teresa F. Gurley, Linda B. Barker, and Cathy A. Boykin, who completed the enormous typing and clerical requirements.

Robert M. Bray, Ph.D.
Project Director

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EXECUTIVE SUMMARY

Background

This report presents the results of the 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel. This study is the fifth in a series of surveys of military personnel conducted in 1980, 1982, 1985, 1988, and 1992 under the direction of the Department of Defense. All of the surveys investigated the prevalence of alcohol use, illicit drug use, and tobacco use, and the consequences of alcohol and other drug use. The 1985 and 1988 surveys also examined health behaviors other than substance use on the quality of life of military personnel. In 1992, we broadened this aspect of the survey to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition. In addition, in the 1992 survey we examined the impact of Operation Desert Shield/Desert Storm on substance use rates; included questions to assess problem gambling in the military; gathered information to estimate selected medical costs of heavy cigarette smoking and heavy drinking among active duty personnel; and made more extensive comparisons with civilian data.

Survey Population and Response Rate

The eligible population of the 1992 survey consisted of all active-duty military personnel except recruits, Service academy students, persons absent without leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. Usable questionnaires were obtained from 16,395 military personnel (4,886 Army, 4,002 Navy, 2,509 Marine Corps, and 4,998 Air Force) for a 77.3% response rate.

Overview of Trends in Substance Use, Negative Effects, and Health Behaviors

During the past 30 days for the total DoD:

- Any illicit drug use declined sharply from 27.6% in 1980 to 3.4% in 1992. This decline was not explained by changes in the sociodemographic composition of the military since 1980.
- Cigarette smoking decreased significantly from 51.0% in 1980 to 35.0% in 1992. As was the case with illicit drug use, this decline was not explained by sociodemographic changes during the survey years.
- Heavy alcohol use declined significantly from 20.8% in 1980 to 15.2% in 1992. However, much of the decline in heavy drinking since 1980 can be attributed to changes in the sociodemographic composition of the military since 1980 rather than to military efforts to curb heavy drinking. The lower rate of heavy drinking in 1992 is explained by a larger proportion of the military being in demographic groups that were less likely to be heavy drinkers than in 1980.

Comparisons of findings from the 1988 and 1992 surveys show that the rates of illicit drug use and cigarette smoking declined significantly, but heavy drinking did not.

- Although heavy drinking did not decrease significantly between 1988 and 1992, the overall rate of alcohol use did decline significantly from 82.8% to 79.6%, primarily due to a decrease in the rate of moderate/heavy drinking from 28.8% to 26.1%.

- We observed significant declines from 1980 to 1992 in alcohol-related serious consequences experienced during the past year (17.3% to 7.6%); productivity loss during the past year (26.7% to 16.4%); and dependence symptoms during the past year (8.0% to 5.2%). However, only alcohol-related productivity loss declined significantly relative to 1988.

- We observed significant declines from 1980 to 1992 in the percentage of personnel with drug-related serious consequences during the past year (13.3% to 0.4%) and drug-related productivity loss during the past year (14.4% to 0.7%). Both of these declines were also significant relative to 1988.

Overall, these findings indicate that the military has made steady and notable progress during the past 12 years in combating illicit drug use and smoking and in reducing drug- and alcohol- related problems. DoD has made less progress in reducing the prevalence of heavy drinking.

Despite notable progress, there is still room for considerable improvement. Cigarette smoking remains common, affecting slightly more than one out of three military personnel. In addition, the rate of heavy drinking (i.e., the consumption level most likely to result in alcohol-related problems) affects about one in seven active duty personnel. Further, when we adjusted the estimates of heavy drinking to reflect changes in the sociodemographic composition of the military, we found that the 1992 rate had not changed significantly from the 1980 rate. This finding suggests that the observed declines in the unadjusted rates of heavy drinking from 1980 to 1992 were largely a function of changes in the demographic composition of the military.

Alcohol Use

- In 1992, 79.6% of military personnel were current drinkers with about two-thirds being moderate to heavy drinkers and 15.2% being heavy drinkers.

- The prevalence of heavy drinking decreased significantly from 1980 to 1992 for the Navy and the Air Force. Heavy drinking in the Army was at about the same level in 1992 as at the start of the Worldwide Survey series in 1980, and heavy drinking among Marine Corps personnel has not shown any significant declines across the survey years.

- The percentage of abstainers among total DoD personnel increased significantly, from 13.5% in 1980 to 20.4% in 1992. The percentage of abstainers also increased significantly between 1980 and 1992 for each of the four Services and between 1988 and 1992 for Army and Air Force personnel. For the Marines, however, the percentage of abstainers decreased significantly between 1988 and 1992 (i.e., the number of drinkers increased.) This increase occurred among moderate drinkers (14.0% in 1988 vs. 19.2% in 1992).

- Comparison of observed rates of heavy drinking (i.e., not adjusted for sociodemographic differences) showed that the prevalence for the Marine Corps (25.5%) was significantly higher than for the other Services. In addition, the rate for the Air Force (10.7%) was significantly lower than that for the Army (17.2%). There was no significant difference between Navy and Air Force rates (13.8% vs. 10.7%).

- Differences in the rates of heavy drinking between the Army and the Air Force, the Marine Corps and the Navy, and the Marine Corps and the Air Force were not explained by differences in the sociodemographic composition of these Services. However, if the sociodemographic compositions of the Services were the same, then the rate of heavy drinking in the Marine Corps would be expected to be about the same as the rate for the Army, and the Army would have a significantly higher rate than the Navy.

- Comparisons of heavy alcohol use between military and civilian populations (after adjusting civilian data to reflect the demographic composition of the military) indicated that military personnel overall and military men were significantly more likely than their civilian counterparts to drink and to drink heavily. The rate of heavy drinking for men aged 18 to 25 was roughly twice as high for military personnel as for civilians (25.9% vs. 13.8%). The drinking patterns of military women were more similar to those for civilian women.

Taken together, these findings suggest that the military has made some gains in reducing any alcohol use and heavy alcohol use among its personnel but that much more work is still needed. The prevalence of heavy drinking decreased significantly from 1980 to 1992 for the total DoD, the Navy, and the Air Force. Only the Air Force showed a significant decrease from 1988 to 1992. However, as noted above for total DoD, the reductions in heavy drinking between 1980 and 1992 appear to be more of a reflection of changes in the sociodemographic composition of the military than a result of programmatic efforts to reduce heavy drinking. In addition, heavy drinking is significantly more common in the military than among civilians.

Illicit Drug Use

- All Services showed the same pattern of significant decreases in past-30-day illicit drug use from 1980 to 1992 that was observed for the total DoD.

- Declines in past-30-day drug use between the 1988 and 1992 surveys were statistically significant for the Army and Air Force, while no statistically significant change was observed for the Navy or the Marine Corps. However, the Marine Corps data had an anomaly in that the trend line showed an apparent upturn. Although not a statistically significant shift, it is the first time since 1980 that the trend line for any of the Services has not maintained a downward pattern. Further exploration showed that the upturn was due to a statistically significant increase from 1988 to 1992 among junior enlisted personnel (E1-E3s).

- Even though we observed the highest rate of drug use among the Marines in 1992, when we controlled for sociodemographic differences, the Marine rate was reduced to a level comparable with the Army and Navy rates.

- When drug use did occur, it was most common among personnel in pay grades E1-E3. Unlike the 1988 survey, we found differences between men and women, with males more likely to be drug users.

- Military personnel (3.4%) were significantly less likely than civilians (9.8%) to have used illicit drugs. This pattern held for both men and women, across all age groups, and across all four Services.

- Marijuana remained the illicit drug most commonly used by military personnel.

In sum, illicit drug use among military personnel declined dramatically between 1980 and 1992 and is now the lowest since the survey series began. Although the declines are probably related in part to similar declines among civilians, drug use was significantly lower in the military than among civilians. Taken together, these findings demonstrate the continuing effectiveness of military efforts to eliminate drug use among military personnel.

Tobacco Use

- The prevalence of any cigarette smoking for the total DoD declined from 51.0% in 1980 to 35.0% in 1992. For all four Services, the prevalence of any cigarette smoking in 1992 was significantly lower than at the start of the Worldwide Survey series in 1980. For the Army, Navy, and Air Force, the prevalence of any smoking was also significantly lower than it was in 1988.

- The prevalence of heavy cigarette smoking (one or more packs per day) for the total DoD also declined significantly from 34.2% in 1980 to 18.0% in 1992. We observed similar overall trends in the decline in heavy smoking relative to 1980 for the Services. Rates of heavy smoking were also significantly lower than in 1988 for the Army, Navy, and Air Force.

- Despite the continued decline in smoking, the rates of any smoking in the total DoD and in all four Services were all still well above the 20% target for military personnel set for Healthy People 2000.

- An estimated 17% of all military personnel smoked cigars or a pipe in 1992, a decrease from 24% in 1988. Approximately the same percentage used smokeless tobacco in the past year, indicating no change since 1988.

- Among men aged 24 and younger, the prevalence of smokeless tobacco use in the past year was nearly twice as high as the rate for all personnel (32.5% vs. 17.4%). Between 1 in 4 and 1 in 3 young men in the Army, Navy, and Air Force used smokeless tobacco products in the past year. Nearly 1 in 2 (47.4%) of the young men in the Marine Corps used smokeless tobacco in the past year. These findings suggest that considerable effort will be needed to achieve the Healthy People 2000 objective of 4% current smokeless tobacco use among males aged 24 and younger.

- During the past year, 52.7% of smokers made an attempt to quit but only about 1 out of 4 of these succeeded.

- Military personnel overall continued to show higher rates of any smoking, compared to civilians (34.3% vs. 30.4%). However, the rate of heavy smoking for the U.S.-based military population (16.3%) was not significantly different from the overall civilian rate (16.0%). There were notable sex differences in this pattern of findings. Men followed the same pattern as total DoD whereas women showed the opposite pattern.

- Rates of <u>any</u> smoking were significantly higher among military men (34.9%) than among civilian men (30.8%), but rates of <u>heavy</u> smoking were not significantly different (16.1% military vs. 16.6% civilian). In contrast, rates of <u>any</u> smoking among military women (31.0%) were not significantly different from rates among civilian women (28.2%), but rates of <u>heavy</u> smoking were significantly higher (17.5% military vs. 12.1% civilian).

In sum, cigarette smoking has declined substantially among military personnel since 1980, particularly since 1985. These declines in part reflect similar declines among civilians but probably also reflect the emphasis of military smoking cessation and prevention programs. Nevertheless, military personnel overall are still more likely to smoke than are civilians. In addition, the rate of smokeless tobacco use in the military, and particularly among young males, is a cause for concern.

Negative Effects of Alcohol and Drug Use

- The occurrences of alcohol-related negative effects (i.e., serious consequences, productivity loss, or dependence symptoms) were more common among E1-E3s than among other pay grade groups. Although rare overall, the occurrence of drug-related negative effects (i.e., serious consequences or productivity loss) was also more likely among E1-E3s.

- Drinking levels were positively related to alcohol-related serious consequences, with heavy drinkers being most likely to encounter alcohol-related serious consequences, followed by moderate/heavy drinkers.

- Drug use patterns were positively related to serious consequences. Users of drugs other than or in addition to marijuana reported significantly more drug-related serious consequences than did users of marijuana only.

- Heavy alcohol use and any drug use were both significantly associated with an increased number of general negative behaviors (not specifically attributed to alcohol or other drug use) for enlisted males and officers, but not for enlisted females. In addition, perceived work-related stress was a significant predictor of general negative behaviors for all three groups.

As indicated earlier, negative effects due to alcohol use and other drug use have declined significantly among military personnel since 1980. These declines are consistent with declines in alcohol and other drug use during this period. Personnel who are heavy drinkers place themselves at greater risk of having alcohol-related serious consequences than do personnel at other drinking levels. In addition, enlisted males and officers who drank heavily, used drugs, or experienced perceived job stress were significantly more likely to experience general negative consequences than were their counterparts. Interventions designed to reduce job stress may help to reduce the occurrence of general negative behaviors.

Selected Medical Costs of Alcohol and Cigarette Use Among Active Duty Personnel

For the first time in the Worldwide Survey series, we estimated selected costs attributable to heavy drinking and heavy smoking that are incurred by the military in the provision of selected medical services to active duty personnel. We estimated tangible medical costs (e.g., outpatient medical services delivered at a military facility) based on self-reported medical service utilization data from survey respondents. However, estimates of the potentially substantial costs associated with diminished productivity, increased absenteeism, educational costs, or property damage were beyond the scope of this effort. Further, we did not examine the costs of alcohol treatment.

- Logistic regression results indicated that heavy smokers were significantly more likely than personnel who were not heavy smokers to use services from a general practitioner at a military facility, after we controlled for the effects of sociodemographic factors such as sex and age that can affect medical service utilization.

- Heavy drinkers were significantly more likely to use outpatient civilian medical services than were other drinkers or abstainers.

[Cost estimates reported in the next three bullets are not total medical costs for the DoD].

- The estimated annual incremental cost imposed on DoD by the "excess" use of outpatient military physician services by active duty heavy smokers was $2.8 million.

- The estimated annual incremental cost imposed on DoD by the "excess" use of outpatient civilian physician services by active duty heavy drinkers was $1.4 million.

- The incremental costs of selected medical services due to "excess" use by active duty heavy drinkers and heavy smokers, $4.2 million, was a fairly modest (0.3%) share of the total active duty medical costs incurred by DoD.

These rather modest estimates must be interpreted with caution, as total costs to DoD associated with heavy alcohol and cigarette use may still be substantial. This analysis examined only a very limited aspect of potential costs that may be associated with heavy drinking or heavy smoking. In particular, we did not examine costs due to increased absenteeism, diminished productivity, or property damage that might be attributable to alcohol use or careless use of cigarettes. In addition, our estimates were restricted to active duty personnel who were fit for duty and were based on respondents' reported use of services. Cost data were not included from other sources (e.g., hospital discharge summaries or outpatient encounter forms), or from other populations served by the military medical system (e.g., retirees or dependents who use a military facility) that are likely to show additional medical costs for DoD associated with heavy alcohol or cigarette use. However, the fact that we detected some increased medical costs attributable to heavy drinking and heavy smoking among the generally young and healthy active duty population indicates that these personnel were already beginning to experience some negative health consequences associated with their use of these substances.

Alcohol, Other Drug, and Tobacco Policies and Programs

- Personnel generally do not believe that drinking and drug use are broadly accepted norms in the military, indicating that the Services offer a climate supportive of reasoned use of alcohol and nonuse of drugs.

- Most military personnel had <u>not</u> received alcohol or other drug abuse treatment. Only 9.5% reported treatment for an alcohol problem and 1.4% for a drug problem.

- Military personnel perceived a number of barriers to seeking help for an alcohol problem, notably that (a) disciplinary action would result; (b) commanders would find out; and (c) one's military career would be damaged.

- Trust in the reliability of drug testing has also increased, with 50.7% in 1992 seeing tests as reliable, compared to 41.2% in 1988.

In sum, military policies and programs appear to be effective in creating an environment conducive to responsible alcohol use and nonuse of drugs. Personnel are generally aware of the health risks of alcohol and other drug use and are moderately aware of the potential effects on job performance and combat readiness. The urinalysis program appears to be an especially effective component of the drug abuse prevention program, but educational programs regarding the risks of alcohol and other drug use and effects on job performance may need to be intensified. Further attention may also need to be paid to any barriers to seeking help, either real or perceived.

Health Behavior and Health Promotion

- Approximately two thirds of all military personnel had their blood pressure checked in the past year, and 36.0% had their cholesterol checked. In comparison, the Healthy People 2000 objectives for blood pressure and cholesterol screening were for at least 90% of adults to have had their blood pressure checked in the past 2 years and be able to state whether it was normal or high, and for at least 75% of adults to have had their cholesterol checked in the past 5 years.

- Over half of personnel in the total DoD and in all four Services engaged in the past month in some form of strenuous physical activity at least 3 days per week for 20 minutes or more. Thus, the military is already greatly exceeding the Healthy People 2000 objective of at least 20% of adults engaging in vigorous physical activity 3 or more days per week for 20 minutes or more.

- The DoD and all four Services had already exceeded, or were very close to achieving, the Healthy People 2000 objective of 50% or more of unmarried individuals having used condoms during their last episode of sexual intercourse, with 50.2% of all unmarried military personnel in the total DoD having used a condom. However, condom use was less common among partners of female personnel and among older personnel.

- In the past year, approximately 10% of all military personnel were identified by a health professional as having high blood cholesterol; 7.9% were identified as having high blood pressure; 9.0% were identified as being overweight; and 12.0% were advised to change their eating habits. However, these are probably conservative estimates of the true prevalence of these problems in the military.

- Approximately 90% of personnel who were identified as having high blood pressure took some action to change their behavior. This percentage of personnel taking action to control their blood pressure matches the Healthy People 2000 objective for adults with high blood pressure taking action to control their blood pressure.

- Less than half of all smokers who were advised by a health professional to quit attempted to do so, and less than 5% succeeded. In comparison, over 50% of all smokers in the total DoD made a serious attempt to quit in the past year, and approximately 13% succeeded.

- Heavy alcohol use and smoking were moderately interrelated. Heavy drinkers were more likely to be smokers than smokers were to be heavy drinkers.

In sum, these findings indicate that DoD and the Services have already made considerable progress toward achieving selected Healthy People 2000 objectives related to health promotion and disease risk reduction. Taken together, these findings suggest that most military personnel enjoy good health and are willing to change their behavior if needed to improve their health. However, more effort may be needed to identify ways to improve the success rate among smokers who try to quit, as well as to encourage smokers to try to quit again, if they had not succeeded in earlier attempts to quit.

Knowledge and Beliefs About AIDS

- The vast majority of military personnel know that HIV (the virus that causes AIDS) can be transmitted through sexual contact or by sharing needles. Most personnel knew the difference between HIV infection and AIDS (88.4%) and knew that an infected person could still look and feel healthy (92.3%).

- Less than half (42.5%) knew that there was a difference in effectiveness between natural-membrane and latex condoms in preventing HIV transmission.

- Sizable percentages incorrectly believed that HIV can be transmitted by nonpersonal contact such as sharing eating utensils with an infected person.

- In general, levels of knowledge about AIDS and beliefs about HIV transmission were comparable between military personnel and civilians. However, a higher percentage of military personnel than civilians correctly knew that natural-membrane condoms and latex condoms are not equally effective in preventing transmission of HIV.

In sum, most personnel were aware of the means through which HIV can definitely be transmitted, including through sexual contact. However, most personnel were not aware of differences between latex and natural-membrane condoms in preventing the spread of HIV. In addition, sizable percentages of personnel still held misconceptions about transmission of HIV through casual contact. These latter findings indicate the need to continue and to intensify military educational efforts about AIDS.

Special Issues

We examined two additional special issues as part of the 1992 Worldwide Survey: (a) the impact that Operation Desert Shield/Desert Storm had on substance use; and (b) the prevalence of problem or pathological gambling in the military.

- An estimate of slightly more than 20% of all active duty military personnel served in Operation Desert Shield/Desert Storm. Approximately 30% of all Army personnel and over 40% of all Marine Corps personnel participated in the Operation.

- Most personnel who served in Operation Desert Shield/Desert Storm decreased their alcohol use during that period or else considered themselves to be nondrinkers. This change was probably due to the cultural prohibitions in the region against alcohol use.

- Nearly one fourth of all individuals serving in Operation Desert Shield/Desert Storm (22.7%) increased their smoking, resumed smoking, or started smoking for the first time during their period of service in the Middle East.

- Now that veterans of Operation Desert Shield/Desert Storm are no longer serving in the Middle East, their patterns of alcohol, other drug, and cigarette use resemble those of personnel who did not serve. Although some significant differences appeared to exist in the substance use patterns of personnel who served or did not serve in the Operation, these differences appeared to be due to sociodemographic differences rather than to service in Desert Shield/Desert Storm.

- For the total DoD, 2.0% of personnel could be classified as probable pathological gamblers, and an additional 5.2% of personnel could be classified as potential problem gamblers.

- Approximately 5% of all military personnel who have been treated for alcohol problems since entering the military could be classified as probable pathological gamblers. In addition, the prevalence of pathological gambling among personnel showing symptoms of alcohol dependence was over 10%, regardless of whether they had ever received treatment.

1. BACKGROUND AND APPROACH

In this report, we present the findings from the 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel conducted by the Research Triangle Institute of Research Triangle Park, North Carolina. We describe substance use, health behaviors, and attitudes of military personnel in 1992 and progress since 1980 toward achieving health-related goals set forth by the Department of Defense (DoD). For this report, "substance use" includes use of alcohol, other drugs, and tobacco (cigarettes, pipes and cigars, and smokeless tobacco).

This study is the fifth in a series of surveys of military personnel across the world conducted in 1980, 1982, 1985, 1988, and 1992 under the guidance of the Department of Defense. All of the surveys investigated the prevalence of alcohol use, drug use, and tobacco use and the negative consequences of alcohol and drug use. The 1985 and 1988 surveys also examined the effect of health behaviors other than substance use on the quality of life of military personnel. In 1992, in collaboration with DoD and the Services, we broadened this aspect of the survey to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition. In addition, the 1992 survey examined the impact of Operation Desert Shield/Desert Storm on substance use rates; included questions to assess problem gambling in the military; gathered information to estimate selected medical costs of heavy smoking and heavy drinking among active duty personnel; and made more extensive comparisons with civilian data.

In this chapter, we introduce the DoD perspective on substance abuse and health behaviors, provide background on the Worldwide Survey series, describe objectives for the 1992 survey, and outline the organization of the report.

1.1 DoD Perspective on Substance Abuse and Health Behaviors

Substance abuse and poor health practices by military personnel interfere with the DoD mission of maintaining a high state of military readiness among the Armed Forces. Consequently, a central aim of DoD is to prevent and minimize the effects of substance abuse on military performance and to promote health behaviors that contribute to good health. Current policy on drug and alcohol abuse is guided by an August 1980 DoD Directive (No. 1010.4), which maintains that "alcohol and drug abuse is incompatible with the maintenance of high standards of performance, military discipline, and readiness (p. 2)." The directive defines alcohol and other drug abuse as:

> The use of alcohol and/or other drugs to an extent that it has an adverse effect on the user's health or behavior, family, community, or the Department of Defense and/or the illegal use of such substances. (DoD Directive 1010.4, 1980, p. 1).

The DoD definition focuses on the adverse consequences of alcohol and other drug use or the illegal use of both alcohol and other drugs. This concept implies that alcohol use, under certain circumstances when it has adverse consequences, and any illicit drug use, per se, are problems. A wide variety of consequences is possible, ranging from morning-after headaches to effects on job performance, health, the military organization, and society at large. Even if the effects or consequences are trivial for the user of illicit drugs, the deleterious effect on military discipline that results from defiance of laws and regulations is sufficient to constitute abuse.

To free the military of alcohol and drug abuse, DoD has mandated a comprehensive set of policies and programs that provide for:

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

In addition to efforts to control substance abuse, the Department of Defense has long recognized the importance of healthy lifestyles for military performance and readiness. Military policy and practice have supported and encouraged the development of beliefs and behaviors that promote sound health through a comprehensive system of medical care. This effort has recently been buttressed by a concentrated health promotion program.

In 1986, the Department of Defense 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. This directive defined health promotion as activities designed to support and influence individuals in managing their own health through lifestyle decisions and self-care.

The health promotion directive identified six broad program areas (two of which address substance abuse): smoking prevention and cessation, physical fitness, nutrition, stress management, alcohol and other drug abuse prevention, and prevention of hypertension.

Smoking cessation and prevention 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. DoD policy prohibits smoking in work areas shared by smokers and nonsmokers, auditoriums, conference rooms, classrooms, and certain other common spaces. Information on the health consequences of smoking is to be presented to military personnel when they enter the Service, as part of routine physical and dental examinations, and at the time of a permanent change of station. At entry nonsmokers are encouraged to refrain from smoking, and smokers are encouraged to quit.

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 as well as 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 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 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, the Department of Defense set forth a comprehensive military policy on the identification, surveillance, and administration of military personnel infected with the human immunodeficiency virus (HIV), the virus associated with the transmission of acquired immune deficiency syndrome (AIDS) (DoD Directive No. 6485.1). 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 AIDS is transmitted and how to prevent transmission.

Considered together, the various DoD policies require the systematic assessment of (a) the nature, extent, and consequences of alcohol and drug abuse within the active force; (b) deterrence and detection efforts aimed at suppressing substance abuse; (c) education and training efforts for substance abuse prevention; (d) substance abuse treatment and rehabilitation programs; and (e) evaluation of the effectiveness of health promotion efforts. Each of these areas requires data to assess needs and track progress. The Worldwide Survey series provides important data that bear on many of these requirements.

1.2 The Worldwide Survey Series

A systematic effort to obtain data that can be used to guide and evaluate substance abuse and health programs and policies began in 1980 under the direction of the Assistant Secretary of Defense (Health Affairs). DoD initiated a series of recurrent surveys to improve understanding of the nature, causes, and consequences of substance use, and health in the military; to determine the appropriateness of the emphasis placed on program elements; and to examine the impact of current and future program policies. The 1980 survey was conducted by Burt Associates, Incorporated, of Bethesda, Maryland, and the 1982, 1985, 1988, and 1992 surveys by Research Triangle Institute (RTI) of Research Triangle Park, North Carolina. All five surveys have assessed the extent and consequences of alcohol and other drug abuse. Beginning in 1985, the surveys have broadened their focus to include an assessment of health promotion efforts.

In addition to the five Worldwide Surveys sponsored by DoD, the individual Services have conducted several related studies. These include a 1977 survey of alcohol problems among Air Force personnel (Polich & Orvis, 1979); the Sample Surveys of Military Personnel (SSMP), an ongoing series of semiannual surveys of Army personnel, some of which include questions about substance use (e.g., Department of the Army, 1986); a 1983 survey of alcohol and drug use among Marines (Stoloff & Barnow, 1984); a 1975 survey of alcohol use and problem drinking among Navy personnel (Cahalan & Cisin, 1975); and studies of smoking in the Navy (Conway, Cronan, & Kaszas, 1989; Cronan & Conway, 1988).

Below, we briefly review the four previous Worldwide Surveys as background to our discussion of the 1992 survey.

The 1980 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel was designed to provide a "comprehensive, detailed, and accurate estimate of the prevalence of nonmedical drug use and alcohol use among the active duty military population worldwide and to provide information on the physical, social, and work-related consequences of substance use in the population." The study thus concentrated on nonmedical drug use and alcohol use and associated consequences, as well as providing the benchmark for the analysis of change in these measures over time. The survey was conducted during February and April 1980. A total of 15,268 military personnel in pay grades E1 to O6 stationed at 81 installations completed self-administered questionnaires. The primarily descriptive analyses are reported in Burt, Biegel, Carnes, and Farley (1980). Analysts reported the prevalence of illicit drug use, alcohol use, and associated negative consequences stemming from this use. The analyses also made selected comparisons between military and civilian populations. The data provided the first comprehensive assessment of substance use and abuse within the active duty military.

The 1982 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel also examined alcohol and nonmedical drug use and associated physical, social, and work-related consequences. Data were collected between September 1982 and January 1983, and analyses were based on completed questionnaires from 21,936 active duty military personnel in pay grades E1 to O6. In the final report, descriptive analyses of the prevalence of alcohol and other drug use and associated consequences were supplemented with more explanatory approaches that examined the predictors of these behaviors. RTI conducted selected comparisons of alcohol and other drug use in military and civilian populations, and investigated the contexts of alcohol and other drug use in the military. The report describes attitudes toward and involvement in military prevention and treatment programs. Analyses are reported in Bray et al. (1983; see also Allen and Mazzuchi, 1985).

The 1985 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel continued the investigation of nonmedical drug use, alcohol use, and associated consequences. The survey assessed 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 relationship of substance use and other health behaviors to health status. Thus, the continuing concerns for the prevalence of alcohol use and nonmedical drug use and associated consequences were placed within a broader health promotion framework. RTI obtained usable questionnaires from 17,328 military members between September and November 1985. Research findings are described in Bray et al. (1986). Specialized analyses are reported in Bray, Marsden, Guess, and Herbold (1989);

Marsden, Bray, and Herbold (1988); Ballweg and Bray (1989); and Bray, Marsden, and Peterson (1991).

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. However, the examination of health attitudes and behaviors had a more central role; the name of the survey was changed accordingly. Questions on health behaviors were augmented and additional questions on stress were included. Overall, the questions permitted the assessment of progress in the military in 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 about the transmission of AIDS, with a view of determining the need for additional educational efforts. Data were obtained from 18,673 active duty personnel between March and May 1988. Research findings appear in Bray et al. (1988). Other special analyses also appear in Bray, Marsden, Rachal, and Peterson (1991), and in Bray, Marsden, Herbold, and Peterson (1992).

1.3 1992 Worldwide Survey

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. We examined health attitudes and behaviors in greater depth than in prior Worldwide Surveys. We included questions that permitted us to assess progress in the military in alcohol and other drug abuse prevention, as well as smoking prevention and cessation, and to provide baseline data on health risks, nutrition, stress, and hypertension.

In addition, in the 1992 survey we examined the impact of Operation Desert Shield/Desert Storm on substance use rates; included questions to assess problem gambling in the military; gathered information to estimate the medical costs of tobacco and alcohol abuse; and made more extensive comparisons with civilian data.

Collectively, the questionnaire items addressed the objectives of the 1992 Worldwide Survey, which were to:

- assess the prevalence of substance use (alcohol, illicit drugs, tobacco, and nonmedical use of psychotherapeutic drugs) during the previous 30 days and 12 months;
- assess negative effects of alcohol and other drug use;

- identify the demographic and behavioral characteristics of substance users;
- examine trends in substance use;
- assess health practices, behaviors, and attitudes;
- examine reasons for substance use and nonuse;
- determine the prevalence of problem gambling among Service members;
- estimate selected medical costs of heavy smoking and heavy drinking among active duty personnel; and
- compare military and civilian rates of substance use and knowledge about AIDS.

The 1992 Worldwide Survey provides a more comprehensive base of information from which to examine substance use and health behaviors among military personnel, the effectiveness of programmatic responses, and the need for alterations and/or additions to program efforts. Further, it provides baseline data to track progress toward meeting the Year 2000 Health objectives described below.

1.4 Healthy People 2000 Objectives and the 1992 Worldwide Survey

Beginning in 1979 with Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention and continuing in 1980 with Promoting Health/Preventing Disease: Objectives for the Nation, the Federal Government has adopted a national health agenda. Healthy People 2000: National Health Promotion and Disease Prevention Objectives (PHS, 1991) sets out health objectives for the year 2000 in the areas of health promotion (e.g., physical activity and fitness, nutrition), health protection (e.g., occupational safety and health, environmental health), preventive services (e.g., chronic disease prevention and detection, prevention of HIV infection), and surveillance and data systems.

Where relevant, we use 1992 Worldwide Survey data to assess progress within the military toward achieving selected Healthy People 2000 objectives. Specifically, the 1992 Worldwide Survey provides information on objectives pertaining to:

- cigarette use and smokeless tobacco use,
- physical exercise,

- cardiovascular disease risk reduction, and
- HIV and other sexually transmitted disease (STD) risk reduction.

1.5 Organization of the Report

In this report we describe the substance use and health behaviors among active duty military personnel throughout the world in 1992 based on findings from the 1992 Worldwide Survey. We describe the general methodology for the study in Chapter 2, including sampling design, instrument development, data collection, measurement approaches, and analysis techniques. In Chapter 3 we provide an overview of trends in substance use, negative effects associated with alcohol and drug use, and involvement in health practices. Trend analyses compare findings from the 1992 Worldwide Survey with findings from the prior four Worldwide Surveys.

In the next three chapters we describe the prevalence, trends, correlates, relation to the military job, and comparisons with the civilian population of rates of alcohol use (Chapter 4), drug use (Chapter 5), and tobacco use (Chapter 6). The latter chapter also describes progress in meeting the Healthy People 2000 objectives on cigarette smoking and smokeless tobacco use. We next examine in Chapter 7 the negative effects of alcohol and drug use for the health, social relationships, and work performance of military personnel.

In Chapter 8, we present for the first time in the Worldwide Survey series an analysis of selected medical costs of heavy drinking and heavy cigarette smoking among active duty personnel. Next, in Chapter 9, we review military substance use policies and programs. We describe DoD policies, along with Service-level programs that respond to the policies, and present findings about the context of programs oriented toward alcohol and drug abuse prevention and treatment, including drug urinalysis testing.

In Chapter 10 we report on health behavior and health promotion including exercise, nutrition, perceived stress and coping, and condom use, and we examine health risk factors and health-related behavior change including an assessment of progress toward the Healthy People 2000 objectives. We follow this in Chapter 11 with a discussion of knowledge and beliefs about HIV infection and AIDS, including beliefs about transmission of the virus and comparisons of knowledge in the military with knowledge by comparable civilians. Finally, in Chapter 12, we examine two special issues assessed in the 1992 survey, the effects of participation in Operation Desert Shield/Desert Storm on substance use behaviors and the prevalence of problem gambling among military personnel.

We have also included several appendices to assist readers interested in details about the sampling and analysis methodologies we employed. Appendix A describes the

sampling design for the 1992 survey. Appendix B contains a discussion of sample weighting and estimation procedures. We have designed Appendix C to help readers use our estimates of sampling errors, and to clarify the suppression rule used with the estimates. Appendix D is a set of supplemental tables that augment data reported in the main text. In Appendix E, we explain how we calculated measurement indexes for alcohol and other substance use; in Appendix F, we discuss the technical details of our approaches to standardization and multivariate analyses, and include tables with parameter estimates from these analyses. Finally, Appendix G is a copy of the survey instrument for the 1992 Worldwide Survey.

2. METHODOLOGY OF THE 1992 WORLDWIDE SURVEY

In this chapter, we describe the methodology used for the 1992 Worldwide Survey. Our discussion includes an overview of the sampling design as well as a description of data collection procedures, survey performance rates, and contents of the survey questionnaire. In addition, we describe the 1992 survey respondents and demographic characteristics of the eligible respondent population including the distribution of occupations. We also provide 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 the Department of Defense, the Services, and the research team.

2.1 Sampling Design Overview

We based the sampling design for the 1992 Worldwide Survey on a two-stage cluster sample to achieve cost efficiency while preserving the inferential capability of the sample. In addition, we designed the sample size for the 1992 survey to be similar to that of prior Worldwide Surveys (e.g., approximately 25,000 persons selected from 63 geographic locations worldwide).

We maintained the 1992 survey at this size and scope for the following reasons:

- Scientific Validity. Previous Worldwide Surveys attained acceptable precision for critical prevalence rates. Similar levels of precision were needed to produce scientifically acceptable results for the 1992 Survey.
- Trend Analysis. In previous Worldwide Surveys, we were able to conduct an in-depth trend analysis for each Service-pay grade group combination. To continue such analysis, we needed to maintain the size of the 1992 sample.
- Declining Drug Use. The fact that substance abuse among military personnel is expected to continue declining means that substance abusers will be harder to find. We needed an adequate sample size to assess both the prevalence and the negative impacts of substance abuse.
- The Drawdown. The size of the active-duty component was smaller in 1992 than for any of the previous Worldwide Surveys. However, a smaller population size did not mean that we could also reduce the sample size requirements.

Finally, in each of the four Worldwide Surveys RTI has conducted, our sampling design has resulted in the attainment of required precision requirements and response rates at budgeted cost.

The eligible population of 1992 survey participants consisted of all active-duty military personnel except recruits, Service academy students, persons absent without leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. We excluded personnel who were recruits, were academy students, or were AWOL or in special environments because they either (a) were not on active duty long enough to typify the Services or (b) were not accessible. Although personnel with PCS status are typical of military personnel, we excluded them because of the practical difficulties of obtaining data from them quickly enough to be of use to the study. We 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, four regions) to address substance use policy and program issues.

We selected the sample in two phases: the first- and second-stage sampling units in the first phase, and the nonresponse sample in the second phase.

2.1.1 Phase 1 Design

We constructed the Phase 1 sampling frame in two stages. The first-stage frame comprised geographically proximal organizational units defined within each Service. The second-stage frame comprised eligible active-duty military personnel attached to selected first-stage units (FSUs).

In cooperation with Headquarters Liasion Officers (HLOs) appointed for each Service, we constructed FSUs by combining geographically proximal Service-level organizational units. We defined the Army, Navy, and Air Force organizational units by the Unit Identification Code (UIC) and the Marine Corps organizational units by the Monitor Command Code (MCC) and Reporting Unit Code (RUC). We then combined organizational units into FSUs on the basis of five-digit zip codes in the continental United States (CONUS) and Army Post Office (APO)/Fleet Post Office (FPO) numbers elsewhere.

We stratified the first-stage sampling frame by Service within the following broadly defined geographic regions of the world:

- Americas--Alaska, Canada, CONUS, Greenland, Iceland, Antigua, Bermuda, Cuba, Diego Garcia, Panama, Puerto Rico;
- North Pacific--Republic of Korea, mainland Japan, Okinawa;
- Other Pacific--Australia, Guam, Hawaii, Johnston Atoll, Midway, Pacific Trust, Philippines, Wake;

- Europe--Belgium, Egypt, Greece, Italy, Netherlands, North Africa, Portugal, Saudi Arabia, Spain, Sicily, Turkey, United Kingdom, Germany.

We defined 15 first-stage strata (one for each Service in each region except for the Marine Corps in Europe, which we sampled in conjunction with the Navy in Europe).

We selected the first-stage sample with probability proportional to size and with minimum replacement (Chromy, 1981). We selected the first-stage sample sequentially from a frame listing that was ordered by the Service-specific major commands to ensure their proportional representation within each first-stage stratum. Finally, we constructed composite size measures to ensure that personnel within each pay grade group in each first-stage stratum were equally likely to be selected.

Second-stage sampling units were lines on the personnel rosters of the organizational units selected at the first stage of sampling. We stratified the second-stage frame into six pay grade groups:

- E1 - E4,
- E5 - E6,
- E7 - E9,
- W1 - W4,
- O1 - O3,
- O4 - O10.

We selected the second-stage sample with equal probability and without replacement from within second-stage strata.

In total, we constructed 690 first-stage sampling units, each averaging 2,531 active duty personnel, and selected 63 first-stage units in the sample. The second-stage sample consisted of 25,887 active duty personnel (8,972 Army, 6,478 Navy, 3,705 Marine Corps, 6,732 Air Force).

2.1.2 Phase 2 Design

The Phase 2 sample consisted of eligible persons selected for Phase 1 but who did not participate. Phase 2 personnel were on leave, in the hospital, on temporary duty assignments (TDY/TAD), at sea or deployed in the field, incarcerated, or available but absent during the Phase 1 survey sessions. We used Phase 2 data to adjust the Phase 1 estimates to compensate for nonresponse bias.

Additional details of the sampling frame construction, sample allocation, and sample selection are in Appendix A.

2.2 Data Collection Procedures

For Phase 1 of the 1992 Worldwide Survey, field teams collected data by conducting group sessions at the installations with personnel selected for participation. We obtained approximately 86% of the completed 1992 questionnaires in Phase 1. To collect Phase 2 data, we mailed questionnaires to the eligible personnel who did not attend a Phase 1 scheduled session.

2.2.1 Phase 1 Data Collection

Phase 1 questionnaire administrations took place from mid-April through May 1992 at the selected installations located in the four world regions. A Headquarters Liaison Officer (HLO) in Washington 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, HLOs:

- generated support for the survey by sending a series of notifications to appropriate command levels,
- obtained MLO names and addresses for RTI staff,
- monitored the production of computer-generated sample personnel lists, and
- worked with RTI staff to coordinate survey scheduling and preparations at the installations.

Before the field team arrived, MLOs were responsible for:

- storing the survey instruments,
- receiving the sample personnel lists,
- notifying sample personnel of their selection for the survey, and
- scheduling the survey sessions for the field team visit.

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. Nine 2-person RTI field teams collected Phase 1 data in survey sessions at the installations selected for the study. In general, we coordinated arrangements with MLOs for the data collection itinerary to permit us to survey personnel at a nucleus installation during a 2-day visit; we allowed additional time at locations that had personnel dispersed

over large geographical areas. We assigned five field teams to the Americas Region, one to the North Pacific Region, one to the Other Pacific Region, and two to the Europe Region. Before data collection began, we trained field team leaders in two 1-day sessions, and team leaders subsequently trained their team assistants.

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 sessions, our team members described the purpose of the study, assured the respondents of anonymity, informed participants of the voluntary nature of the survey, and showed personnel the correct procedures for marking the questionnaire. Then team members distributed optical-mark questionnaires to participants who completed them and returned them. On average, the questionnaire required about 55 minutes to complete.

During the visit to a first stage-unit (installation), our team members attempted to survey all eligible individuals. At each FSU, team members used rosters to document individuals' attendance at a session or the reasons for absences. At the completion of the site visit, our field teams inventoried completed questionnaires, reconciled the inventory with documented counts from the lists of sample personnel completing the survey, and packaged the questionnaires for shipment. The teams shipped the questionnaires to CTB McGraw-Hill for optical-scan processing.

2.2.2 Phase 2 Data Collection

At the conclusion of Phase 1 data collection for each FSU, our field teams mailed questionnaires to all eligible Phase 1 nonrespondents.

The procedure for conducting the Phase 2 data collection was to:

- document the status of each individual on the selected personnel list (e.g., attended, TDY, on leave, PCS),

- identify personnel eligible for Phase 2 data collection (this included those who were on temporary duty assignments, on leave, deployed, sick, geographically separated from the nucleus unit, or in jail, or who were "no shows" for Phase 1),
- obtain a correct mailing address from the MLO for Phase 2 eligible personnel, and
- prepare and mail a survey packet to Phase 2 personnel.

The Phase 2 packet included a cover letter from RTI that explained the purpose and importance of the study, a copy of a blank questionnaire precoded to identify the FSU and the study phase, and a business reply envelope for the respondent to use in mailing the completed questionnaire directly to CTB McGraw-Hill in Durham, NC, for scanning. As with Phase 1 data collection, respondents completed the questionnaire anonymously.

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 different performance rates, each important from a survey operational perspective or from a statistical perspective. In the simplest of cases, the response rate is:

- the number of individuals in the population of inferential interest for whom the information was obtained,
- divided by the total number of individuals in the population of inferential interest who were slated for the collection of information.

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, however, the definition becomes more complicated. For the 1992 survey we computed four different performance rates, which we define below: eligibility rate, availability rate, completion rate, and response rate among eligibles. (Data for these four elements are in Table 2.1 along with the corresponding response data that we used to compute them.)

Eligibility rate is the percentage of individuals we selected for the sample who were still eligible several weeks later during data collection. Individuals we selected might have been ineligible because they left the military, or were AWOL, deceased, PCS, or unknown. 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 overall eligibility rate was 82.0%. The rate was lowest for the Army due primarily to movement associated with the drawdown.

Table 2.1 Survey Response Data and Performance Rates

Item	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Response Data					
1. Persons selected for survey (total sample)	8,972	6,478	3,705	6,732	25,887
2. Number of eligible persons identified[a]	6,592	5,420	3,328	5,880	21,220
3. Eligibles available during Phase 1 data collection sessions	4,981	3,717	2,437	4,603	15,738
4. Questionnaires obtained from Phase 1	4,324	3,314	2,188	4,387	14,213
5. Questionnaires obtained from Phase 1 with usable information	4,276	3,261	2,174	4,357	14,068
6. Number of Phase 2 eligible persons identified = (Item 2 - Item 4)	2,268	2,106	1,140	1,493	7,007
7. Questionnaires obtained from Phase 2 data collection	616	751	337	646	2,376[b]
8. Questionnaires obtained from Phase 2 with usable information	610	741	335	641	2,327
9. Total questionnaires with usable information	4,886	4,002	2,509	4,998	16,395
Performance Rates					
10. Eligibility rate (%) = (Item 2/ Item 1)*100	73.5	83.7	89.8	87.3	82.0
11. Availability rate (%) = (Item 3/ Item 2*100	75.6	68.6	73.2	78.3	74.2
12. Completion rate (%) = (Item 4/ Item 3)*100	86.8	89.2	89.8	95.3	90.3
13. Phase 1 response rate among eligibles (%) = (Item 5/Item 2)*100	64.9	60.2	65.3	74.1	66.3
14. Phase 2 response rate among eligibles (%) = (Item 8/ Item 6)*100	26.9	35.7	29.4	42.9	33.2
15. Response rate among eligibles = (Item 9/Item 2) * 100	74.1	73.8	75.4	85.0	77.3

Note: Response data are frequencies; performance rates are percentages.

[a]Excludes 4,667 individuals from the sample who had a permanent change of station (PCS) (3,218) or who were separated (1,212), unknown (125), absent without leave (AWOL) (11), deceased (3), or a basic trainee or reservist (2).

[b]Total DoD includes 26 cases for which Service could not be determined.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Availability rate is the percentage of identified eligible persons who were available to participate in Phase 1 group sessions. For various reasons, including temporary duty assignment, deployment and illness, some sample individuals were not available for Phase 1 questionnaire administrations. The availability rate was important operationally, largely determining the facilities needed for the group sessions, data collection schedules, and other factors. The nonresponse of available individuals added another component to the total missing data or nonresponse bias potential. The overall availability rate during Phase 1 data collection was 74.2%. The availability rate suggests that we needed the Phase 2 data to compensate for the potential for nonresponse bias in Phase 1.

The **completion rate** is the percentage of identified eligible personnel who attended a Phase 1 session and completed a questionnaire. The completion rate affected data processing costs and schedules, and the missing data contributed to the potential for biases. The 90.3% completion rate 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. Overall, if personnel were available at the installations, the MLOs were effective in getting personnel to attend sessions. The Air Force (95.3%) had the highest completion rate, followed by the Marine Corps (89.8%), the Navy (89.2%) and the Army (86.8%).

Response rate among eligibles is the rate at which we obtained usable questionnaires from eligible personnel for both phases of data collection. For the response rate calculation, we excluded ineligible individuals from the population (i.e., those separated, deceased, AWOL, PCS, or unknown). We computed this rate as the total number of respondents who provided questionnaires with usable information from Phase 1 and Phase 2 divided by the number of eligible persons identified in the sample. Overall, this rate was 77.3% .

2.4 Survey Questionnaire and Data Validity

The survey instrument was a self-administered questionnaire designed for optical mark reader scanning. In collaboration with DoD, the HLOs, and other subject-matter experts from the Services, we modified the 1988 questionnaire for 1992 to give greater emphasis to health attitudes and behaviors including perceived stress, health risks, knowledge and beliefs about HIV transmission, and nutrition. In addition, we included questions to assess problem gambling, to explore the effects of Desert Shield/Desert Storm on substance use, and to provide information to estimate selected medical costs of heavy smoking and heavy drinking among active duty personnel. Questionnaire items addressed the areas specified in the 1992 Worldwide Survey objectives, which were to:

- assess the prevalence of substance use (alcohol, illicit drugs, tobacco, and nonmedical use of psychotherapeutic drugs) during the previous 30 days and 12 months;
- assess the negative effects of alcohol and drug use;
- identify the demographic and behavioral characteristics of substance users;
- examine trends in substance use;
- assess health practices, behaviors, and attitudes;
- examine reasons for substance use and nonuse;
- determine the prevalence of problem gambling among Service members;
- estimate selected medical costs of heavy smoking and heavy drinking among active duty personnel; and
- compare military and civilian rates of substance use and knowledge about AIDS.

The questionnaire appears in Appendix G.

During fall 1991, we conducted a pilot study at one military installation for each Service to examine the adequacy of questionnaire item wording, formatting, and response alternatives. Based on inspections of item distributions and informal debriefings of participants, we changed some items and modified item formatting/wording to enhance clarity.

Many individuals question the validity of self-reported data on alcohol and drug use, claiming that survey respondents will give socially desirable rather than truthful answers. This issue was of particular concern for the 1992 survey because of the drawdown taking place in the military and the belief that Service members might not reveal anything about behaviors that could have the potential to jeopardize their careers in the military.

A series of studies has demonstrated that although self-reports may sometimes underestimate the extent of substance use, the method generally provides useful and meaningful data. For example, Polich and Orvis (1979) examined the validity of alcohol-problem measures among Air Force personnel. They found little evidence of underreporting in comparisons of 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-report data among respondents from the U.S. civilian general population have been explicitly tested in relation to alcohol use (Mayer & Filstead, 1979; Midanik, 1982; Smith, Remington, Williamson & Anda, 1980; Lemmens, Tan, & Knibbe, 1992), drug use (Haberman, Josephson, Zanes, & Elinson, 1972; Kandel & Logan, 1984; O'Malley, Bachman, & Johnston, 1983; Rouse, Kozel & Richards, 1985), and delinquent behavior among adolescents (Blackmore, 1974; Doleschal, 1970; Erickson & Empey, 1963; Gibson, Morrison, & West, 1970; Gold, 1966; Gould, 1969; Williams & Gold, 1972; Elliott & Huizinga, 1984; Hindelang, Hirschi, & Weiss, 1981). Overall, the various reviews of the literature are encouraging in suggesting that self-reports of youth on alcohol use, drug use, and delinquent behavior are generally reliable and valid.

The monograph by Rouse, Kozel and Richards (1985), in particular, addressed research on the validity of self-reported drug use. A general conclusion emerging from the various reviews reported in this monograph is that most respondents will be truthful when the conditions are favorable for them to do so. 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 (Johnston & O'Malley, 1985). Throughout the Worldwide Survey series, we have been rigorous in following procedures consistent with those that encourage honest reporting (e.g., respondents are anonymous, questionnaires are answered privately, civilian teams collect the data and promise it will not be shown to military personnel at the installation).

Support for the validity of data reported in the 1992 Worldwide Survey derives from this extensive body of research and corroborating urinalysis test data from military personnel. Urinalysis test results show a decline in opiate use from 41 per 10,000 urine tests in 1977 to 40 in 1978, 27 in 1979, 29 in 1980, and 14 in 1981 (Beary, Mazzuchi, & Richie, 1983). Survey data are consistent with these test results. More recent test results also show a continuing declining pattern during the 1980s to the present (R. L. Hilderbrand, Office of Department of Defense Coordinator for Drug Enforcement Policy and Support, personal communication, September 1992).

2.5 Sample Participants and Military Population Characteristics

Table 2.2 displays the distribution of survey respondents for each Service by region and pay grade. Overall, we obtained 16,395 usable questionnaires from sampled personnel. The Air Force had the largest number of respondents (4,998) followed by the Army (4,886), Navy (4,002) and Marine Corps (2,509). The number of respondents is a function of the number of personnel we sampled in each Service and the response rates.

Table 2.2 Distribution of 1992 Worldwide Survey Respondents, by Region and Pay Grade

Region/Pay Grade	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Americas					
E1-E3	141	142	131	215	629
E4-E6	1,130	879	326	1,366	3,701
E7-E9	864	742	324	964	2,894
W1-W4	166	72	79	*	317
O1-O3	211	141	73	280	705
O4-O10	313	209	91	473	1,086
Total	2,825	2,185	1,024	3,298	9,332
North Pacific					
E1-E3	23	46	85	22	176
E4-E6	88	260	184	205	737
E7-E9	73	193	166	144	576
W1-W4	15	18	31	*	64
O1-O3	12	40	31	44	127
O4-O10	39	51	53	37	180
Total	250	608	550	452	1,860
Other Pacific					
E1-E3	36	39	95	44	214
E4-E6	228	294	307	298	1,127
E7-E9	181	197	172	177	727
W1-W4	46	17	36	*	99
O1-O3	52	32	46	53	183
O4-O10	77	34	62	59	232
Total	620	613	718	631	2,582
Europe					
E1-E3	56	31	68	47	202
E4-E6	477	347	87	270	1,181
E7-E9	359	144	24	169	696
W1-W4	85	15	1	*	101
O1-O3	72	25	17	35	149
O4-O10	142	34	20	96	292
Total	1,191	596	217	617	2,621
Total Worldwide					
E1-E3	256	258	379	328	1,221
E4-E6	1,923	1,780	904	2,139	6,746
E7-E9	1,477	1,276	686	1,454	4,893
W1-W4	312	122	147	*	581
O1-O3	347	238	167	412	1,164
O4-O10	571	328	226	665	1,790
Total	4,886	4,002	2,509	4,998	16,395

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

*There are no warrant officers in the Air Force.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

The pay grade distribution for the total DoD shows that the largest number of participants were E4-E6s, followed by E7-E9s, O4-O10s, E1-E3s, O1-O3s, and W1-W4s. This pattern was generally consistent across regions. For the analyses, we weighted the data to reflect the proportional representation of respondents in the population. That is, because E1-E3s comprised a larger proportion of the military than E4-E6s, we weighted their responses more heavily to reflect this greater representation.

Table 2.3 shows the distribution of survey respondents for sociodemographic subgroups. As can be seen, all subgroups except for those who had less than a high school education had 30 or more respondents and many had several hundred. For our analyses, we suppressed estimates based on fewer than 30 cases because the estimates were likely to be unreliable. Many tables in subsequent chapters of the report present data in the form of some variation of the pattern shown in Tables 2.2 and 2.3. Because of the large number of different cell sizes, it was not feasible to present sample sizes in the individual analytical tables. Thus, readers will need to refer to these tables for the approximate sample sizes used.

Table 2.4 presents the sociodemographic characteristics of the 1992 eligible respondent population. This population included all active duty personnel except recruits, Service academy students, those who were AWOL, and those who were PCS at the time of data collection. Consequently, characteristics of the respondent population may differ somewhat from characteristics of the total Active Force. As shown in Table 2.4, the majority of personnel were males (85.0%), white (66.9%), educated through high school or beyond (99.5%), age 34 or younger (76.3%), married (62.6%), and in pay grades E1-E6 (73.8%).

Inspection of Table 2.4 also shows some notable differences in demographic composition among the Services. The most striking contrast occurred between Marine Corps and Air Force personnel. Marine personnel were most likely to be educated only through high school (62.7%); to be age 25 or younger (57.2%), to be unmarried (50.2%), and to be of junior pay grade E1-E3 (40.3%). In contrast, Air Force personnel were most likely to have some college education or a college degree (78.0%), to be age 26 or older (70.6%), to be married (70.0%), and to be of enlisted pay grade E4-E6 (56.6%) or to be officers (20.1%). These differences are of interest because the demographics found in the Marine Corps correspond closely to those of personnel in prior Worldwide Surveys (e.g., Bray et al., 1986, 1988) who were more likely to engage in illicit drug use and heavy alcohol use (i.e., those who were younger, less well educated, unmarried, and in junior enlisted pay grades). This finding suggests that the Marine Corps may face a greater challenge than the other Services in addressing substance use issues.

Table 2.5 depicts the occupational classification of military personnel. Instead of asking respondents to report their formal military occupational specialty/rating, we asked

Table 2.3 Distribution of 1992 Worldwide Survey Respondents by Sociodemographic Characteristics

Sociodemographic Characteristic	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Sex					
Male	4,365	3,391	2,367	4,324	14,447
Female	521	611	142	674	1,948
Race/Ethnicity					
White	2,885	2,904	1,755	3,740	11,284
Black	1,282	527	459	742	3,010
Hispanic	471	245	204	308	1,228
Other	248	326	91	208	873
Education					
Less than high school	17	26	15	1	59
High school grad/GED	1,243	1,428	1,118	779	4,568
Some college	2,388	1,718	904	2,716	7,726
College degree or beyond	1,238	830	472	1,502	4,042
Age					
20 and under	196	155	173	143	667
21-25	690	705	479	653	2,527
26-34	1,749	1,492	904	1,833	5,978
35 and older	2,251	1,650	953	2,369	7,223
Marital Status					
Not married	1,174	1,243	787	1,202	4,406
Married	3,712	2,759	1,722	3,796	11,989
Pay Grade					
E1-E3	256	258	379	328	1,221
E4-E6	1,923	1,780	904	2,139	6,746
E7-E9	1,477	1,276	686	1,454	4,893
W1-W4	312	122	147	*	581
O1-O3	347	238	167	412	1,164
O4-O10	571	328	226	665	1,790
Total Personnel	4,886	4,002	2,509	4,998	16,395

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

*There are no warrant officers in the Air Force.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 2.4 Sociodemographic Characteristics of Eligible Respondent Population

Sociodemographic Characteristic	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	86.2 (1.5)	80.1 (4.0)	96.1 (0.4)	84.6 (1.0)	85.0 (1.5)
Female	13.8 (1.5)	19.9 (4.0)	3.9 (0.4)	15.4 (1.0)	15.0 (1.5)
Race/Ethnicity					
White	57.4 (1.7)	68.4 (2.0)	68.9 (1.3)	74.8 (1.8)	66.9 (1.0)
Black	27.3 (1.8)	17.7 (1.9)	19.3 (1.4)	14.5 (1.6)	19.9 (0.9)
Hispanic	10.3 (0.9)	6.8 (1.0)	8.1 (1.3)	6.9 (0.8)	8.0 (0.5)
Other	5.0 (0.5)	7.1 (1.4)	3.7 (0.9)	3.8 (0.3)	5.2 (0.4)
Education					
Less than high school	+ (+)	+ (+)	+ (+)	+ (+)	0.5 (0.1)
High school grad/GED	38.0 (2.9)	46.1 (4.2)	62.7 (4.0)	22.0 (1.8)	38.5 (2.0)
Some college	42.1 (1.8)	37.4 (1.8)	25.5 (2.6)	52.5 (2.1)	41.9 (1.2)
College degree or beyond	19.4 (3.3)	15.8 (3.2)	10.8 (2.2)	25.5 (3.4)	19.1 (1.8)
Age					
20 and under	10.3 (1.1)	10.3 (1.9)	19.0 (3.4)	5.8 (0.8)	9.9 (0.9)
21-25	27.8 (2.2)	32.9 (3.1)	38.2 (4.0)	23.6 (1.8)	29.2 (1.4)
26-34	37.0 (1.1)	35.7 (2.2)	28.6 (1.4)	42.4 (1.4)	37.2 (0.9)
35 and older	25.0 (2.9)	21.2 (3.0)	14.3 (3.4)	28.2 (3.0)	23.6 (1.6)
Marital Status					
Not married	33.9 (1.7)	43.6 (4.0)	50.2 (3.8)	30.0 (1.1)	37.4 (1.6)
Married	66.1 (1.7)	56.4 (4.0)	49.8 (3.8)	70.0 (1.1)	62.6 (1.6)
Pay Grade					
E1-E3	13.4 (1.7)	20.2 (4.6)	40.3 (3.6)	12.6 (1.4)	18.1 (1.7)
E4-E6	57.4 (2.5)	58.4 (4.1)	40.5 (2.5)	56.6 (3.0)	55.7 (1.8)
E7-E9	11.3 (1.0)	9.8 (1.4)	8.3 (1.4)	10.7 (0.8)	10.4 (0.6)
W1-W4	2.5 (0.5)	0.5 (0.1)	1.1 (0.3)	* (*)	1.0 (0.1)
O1-O3	8.8 (1.0)	6.7 (1.8)	6.5 (0.3)	12.2 (1.5)	8.9 (0.8)
O4-O10	6.6 (2.5)	4.4 (1.4)	3.3 (1.6)	7.9 (2.8)	5.9 (1.2)
Total Personnel	30.8 (2.1)	30.0 (3.4)	10.7 (1.4)	28.5 (1.8)	100.0 (--)

Note: Table values are column percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 2.5 Occupational Characteristics of Eligible Respondent Population

Pay Grade/Occupation*	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Enlisted					
Direct combat	22.2 (4.1)	7.1 (0.9)	37.6 (2.6)	8.0 (1.5)	15.3 (1.5)
Electronic equipment repair	4.3 (0.8)	12.8 (1.7)	3.7 (0.8)	9.5 (0.9)	8.3 (0.7)
Communications & intelligence	9.5 (1.7)	9.5 (2.2)	12.8 (2.5)	7.7 (2.0)	9.4 (1.1)
Health care	8.2 (2.4)	7.8 (3.6)	* (*)	6.0 (1.6)	6.5 (1.4)
Other technical	3.4 (0.4)	3.6 (0.8)	4.3 (1.3)	7.8 (0.8)	4.7 (0.4)
Support & administration	20.5 (2.2)	12.8 (2.0)	16.9 (2.4)	23.8 (1.9)	18.6 (1.2)
Electrical/mechanical repair	14.9 (1.9)	22.3 (2.9)	9.7 (2.2)	19.2 (2.9)	17.8 (1.5)
Craftsman	1.0 (0.3)	8.5 (2.1)	2.3 (0.5)	3.9 (0.5)	4.3 (0.9)
Service and supply	10.8 (1.7)	7.0 (1.2)	9.4 (1.4)	8.3 (0.7)	8.8 (0.7)
Non-occupational	5.3 (0.6)	8.5 (1.2)	3.3 (1.5)	5.8 (0.7)	6.2 (0.5)
Officer					
General officer or executive	7.3 (1.3)	14.9 (1.8)	14.9 (2.5)	5.6 (1.9)	8.9 (0.8)
Tactical operations	26.0 (3.5)	24.3 (5.8)	34.4 (3.5)	27.9 (6.3)	26.9 (2.9)
Intelligence	5.3 (1.6)	2.7 (0.6)	10.6 (2.5)	+ (+)	6.1 (2.0)
Engineering/maintenance	11.0 (1.9)	15.7 (3.7)	10.0 (2.8)	13.6 (2.4)	12.9 (1.4)
Scientist/professional	8.7 (2.6)	5.0 (1.0)	4.9 (1.7)	15.0 (3.5)	9.9 (1.7)
Health care	+ (+)	+ (+)	* (*)	13.4 (3.3)	13.1 (3.1)
Administrator	15.2 (2.0)	7.7 (1.3)	12.5 (2.5)	8.6 (0.8)	11.0 (0.8)
Supply/procurement	6.1 (0.8)	8.9 (1.6)	9.9 (0.9)	5.2 (1.2)	6.6 (0.6)
Non-occupational	4.2 (2.5)	+ (+)	2.9 (1.1)	2.6 (1.1)	4.5 (1.7)

Note: Table values are column percentages (with standard errors in parentheses).

*Data represent a self-reported functional job classification (in which personnel specified their military occupations) rather than a formal job classification based on official occupational specialities/ratings.

+Unreliable estimate.

*There are no health care personnel in the Marine Corps.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

them to identify their enlisted or officer job categories using the DoD occupational coding structure (DoD, 1989). The job categories in this structure provide a common set of job classifications that crosscut Military and civil service occupations. There are 10 occupational areas for enlisted personnel and 9 occupational areas for officers (see items 14 and 15 in questionnaire, Appendix G). Because we asked respondents to classify themselves into these job categories, our results may differ from those obtained by converting actual military specialties into the coding structure. Thus, our reporting of occupations represents a functional job classification rather than a formal classification. No comparisons have been made to determine the correspondence between the distributions from our functional classification and a formal classification using occupational specialties or ratios. Consequently, data on occupations need to be interpreted in the context of perceived job functions.

For enlisted personnel, half classified themselves into one of three job categories: support and administration (18.6%), electrical/mechanical repair (17.8%), or direct combat (15.3%). Understandably, these classes varied by Service in line with mission requirements. For the Army the most common job classes were direct combat (22.2%), support and administration (20.5%), and electrical/mechanical repair (14.9%). For the Navy the classes were electrical/mechanical repair (22.3%), support and administration (12.8%), and electronic equipment repair (12.8%). For the Marine Corps the classes were direct combat (37.6%), support and administration (16.9%), and communications and intelligence (12.8%). For the Air Force the classes were support and administration (23.8%) and electrical/mechanical repair (19.2%).

For officers, the majority classified themselves into one of four job categories: tactical operations (26.9%), health care (13.1%), engineering/maintenance (12.9%), and administrator (11.0%). These classifications also varied by Service. Army officers basically mirrored the total DoD classes of tactical operations (26.0%), administrator (15.2%), and engineering/maintenance (11.0%). Navy officers were most likely to classify their jobs as tactical operations (24.3%), engineering/maintenance (15.7%), or general officer or executive (14.9%). Marine Corps officers were most likely to classify their jobs as tactical operations (34.4%), general officer or executive (14.9%), or administrator (12.5%). Air Force officers were most likely to classify their jobs as tactical operations (27.9%), scientist/professional (15.0%), engineering/ maintenance (13.6%), or health care (13.4%).

2.6 Measurement Approaches

Measurement for the 1992 study focused on prevalence and correlates of substance use and abuse, negative effects of alcohol use and illicit drug use, and health behaviors. This section briefly discusses the key measures we used in the analyses throughout the

report. Additional details about construction of specific behavioral measures and attitudinal indexes appear in Appendix E.

2.6.1 Alcohol Use

We measured alcohol use in this study in terms of quantity of alcohol consumed and frequency of drinking. We have expressed alcohol use in summary form as average number of ounces of absolute alcohol (ethanol) consumed per day and as drinking levels.

Average Daily Ethanol Consumption. We constructed an index following the method used in the 1988, 1985, and 1982 Worldwide Surveys and the Rand Study (Polich & Orvis, 1979), combining the quantity and frequency of alcohol use to determine the average daily ounces of ethanol consumed. We computed the ethanol index as a function of the amount of ethanol contained in the ounces of beer, wine, and hard liquor consumed on a typical drinking day during the past 30 days, the frequency of use of each beverage, and the amount of ethanol consumed on atypical ("heavy") drinking days during the past 12 months. The index represented average daily ounces of ethanol consumed during a 12-month period. Although we have expressed the index in terms of 12-month use, most of the data came from reports of 30-day typical use. Appendix E presents a more detailed discussion of the method of construction.

Drinking Level Classification. Another measure that combined information on quantity and frequency of alcohol use was the drinking level classification scheme that we adapted from Mulford and Miller (1960; see also Rachal et al. 1975, 1980; Rachal, Hubbard, Williams, & Tuckfeld, 1976) and that we used previously in the 1982, 1985, and 1988 Worldwide Surveys (Bray et al., 1983, 1986, 1988).

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 hard liquor) with the largest amount of absolute alcohol per day to fit the individual into one of the ten categories resulting from all combinations of quantity and frequency of consumption. We then collapsed the resulting quantity/frequency categories into five drinking-level groups: abstainers, infrequent/light drinkers, moderate drinkers, moderate/heavy drinkers, and heavy drinkers, as shown in Table 2.6.

2.6.2 Illicit Drug Use

We measured illicit drug use in this study in terms of the prevalence of nonmedical use of any of 11 categories of drugs: marijuana/hashish, phencyclidine (PCP), LSD or other hallucinogens, cocaine, amphetamine or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, designer drugs, and anabolic steroids. We made no attempt to

Table 2.6 Drinking Level Classification Scheme

Drinking Level Groups	Definition
Abstainer	Drinks once a year or less.
Infrequent/Light Drinker	Drinks 1-4 drinks per typical drinking occasion 1-3 times per month.
Moderate Drinker	Drinks 1 drink per typical drinking occasion at least once a week, or 2-4 drinks per typical drinking occasion 2-3 times per month or 5 or more drinks per typical drinking occasion once a month or less.
Moderate/Heavy Drinker	Drinks 2-4 drinks per typical drinking occasion at least once a week or 5 or more drinks per typical drinking occasion 2-3 times per month.
Heavy Drinker	Drinks 5 or more drinks per typical drinking occasion at least once a week.

measure quantity (e.g., number of pills) or the size of doses because most respondents cannot furnish this information adequately and because of the considerable variation in "street" drug purity.

To estimate the prevalence of use, we included questions about use of each drug type within the past 30 days and within the past 12 months. In addition, we created indices for estimating the prevalence of use of any illicit drug (omitting steroids) and any drug besides marijuana (omitting steroids). Definitions followed those used in the 1982, 1985, and 1988 Worldwide Surveys to facilitate comparisons. These definitions have also been used in recent waves of the National Household Survey on Drug Abuse (NHSDA). We constructed indices of any drug use and any drug use except marijuana 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 that we included (i.e., all, or all but the marijuana category).

Another index examined patterns of use: no use, marijuana-only use, and any other drug use pattern (which could include marijuana use but required use of one or more additional types of drugs). The other-use pattern did not imply simultaneous use of the drugs but, rather, the use of several types of drugs during the past 30 days or 12 months.

2.6.3 Tobacco Use

Most analyses of tobacco use focused on cigarette smoking, the most widely used form of tobacco. Our primary measures of cigarette use assessed prevalence of any current smoking and heavy smoking during the past 30 days. We defined current

smokers as those who smoked at least 100 cigarettes during their lifetime and smoked during the past 30 days. We defined heavy smokers as current smokers who smoked one or more packs of cigarettes per day. In some analyses we also classified personnel by categories of never smoked, former smokers (those who quit more than 30 days ago), and current smokers. The 1992 survey also measured the prevalence of use of other forms of tobacco use besides cigarettes (cigars, pipes, smokeless tobacco).

2.6.4 Negative Effects

We examined the negative effects of alcohol and drug use experienced by military personnel using measures available in all of the Worldwide Surveys. Because of item changes across some of the Worldwide Surveys, we could not compute some indexes used in earlier surveys. For this study, we have reported three measures of negative effects: serious consequences, productivity loss, and dependence symptoms. We based these measures on occurrences due to alcohol or other drug use in the past 12 months of the items noted below:

- Serious Consequences: UCMJ (Uniform Code of Military Justice) punishment, loss of 3 or more work days, kept from duty 1 week or more by illness, hurt in accident (for drugs only), spouse left, DWI (driving while impaired) arrest, incarceration, fights, arrest for nondriving drinking or drug incident, not getting promoted, and being detoxified.

- Productivity Loss: being late for work or leaving early, not coming to work at all, being drunk or high at work, or performing below a normal level of productivity because of alcohol or other drug use or the aftereffects or illness resulting from drinking or drug use.

- Dependence Symptoms: unable to remember some things done while drinking the day before, had shakes because of drinking or hands shook a lot after drinking day before, could not stop drinking before becoming drunk, took drink first thing when got up.

The indexes of serious consequences and productivity loss for alcohol use and for other drug use showed the percentage of personnel who reported any occurrence of the problems captured by the items. For the dependence symptoms measure, we expressed occurrences of each symptom during the past year as an estimated number of days. We then summed these frequencies over the four symptoms, and classified individuals with scores of 48 or more as dependent. We computed the dependence symptoms measure only for alcohol use because of the small number of drug users.

Our measure of dependence symptoms is based on the Rand Air Force study definition (Polich & Orvis, 1979) that has been used in prior Worldwide Surveys. This definition does not reflect the strict definition of dependence used in the Diagnostic and

statistical manual of mental disorders (DSM-III-R) but was used here to permit comparisons with data from prior Worldwide Surveys.

2.6.5 Health Behaviors

A major emphasis of the 1992 Worldwide Survey was the investigation of health behaviors of military personnel. We examined the relationship between substance use and involvement in various health practices, as well as health care utilization (number of illnesses, number of doctor visits, number of days hospitalized during the past 12 months), and awareness about AIDS. These analyses have provided basic information about health practices in the military and the viability of health promotion approaches in decreasing substance abuse.

2.6.6 Gambling Behaviors

Respondents in the 1992 Worldwide Survey were asked a series of eight questions about gambling, to assess the lifetime prevalence of gambling problems and the lifetime prevalence of pathological gambling in the military. Items on gambling-related problems were patterned after the American Psychiatric Association's (APA's) diagnostic criteria. Specifically, respondents were asked whether they had ever had any of the following gambling-related problems:

- being increasingly preoccupied with gambling;
- needing to gamble with increased amounts of money to achieve the desired level of excitement;
- feeling restless or irritable when unable to gamble;
- gambling to escape from problems;
- going back to try to win back earlier gambling losses;
- lying to others about the extent of their gambling;
- having jeopardized or lost important relationships, a job, or career opportunities because of gambling; and
- borrowing money to relieve financial problems caused by gambling.

An affirmative answer to at least one of the above items were considered to be indicative of problem gambling at some point in a person's life, but not necessarily pathological gambling. Answering affirmatively to three or more problem items was considered to indicate probable pathological gambling (H.R. Lesieur, personal communication, June 10, 1991).

2.7 Analytical Approach

We oriented our analyses of the 1992 Worldwide Survey data toward providing knowledge about current levels of substance use and health behaviors, negative effects associated with alcohol and other drug use, and trends in these behaviors throughout the Worldwide Survey series since 1980. These analyses will provide information to help assess and guide policy and program directions, including the most effective targeting of resources to the problem areas.

To accomplish these aims, we conducted six basic types of analyses within this study:

- descriptive univariate and bivariate analyses of the extent of substance use, negative consequences, and health behavior in 1992 and the relationship between substance use and a variety of negative effects, for the total DoD and the Services;
- comparisons of trends in substance use and negative effects from 1980 to 1992, and trends in health behaviors from 1985 to 1992;
- standardized comparisons of the extent of substance use among personnel in the four active Services;
- standardized comparisons of military and civilian rates of substance use and of beliefs and knowledge about HIV transmission;
- assessment of selected medical costs of heavy drinking and heavy smoking among active duty personnel; and
- multivariate analyses of the contribution of certain causal factors to substance use and negative consequences.

These approaches, taken together, have provided descriptive and interpretive information on the extent and nature of substance use and negative consequences among military personnel.

An important part of the analyses we conducted for this study was the comparison of trends across the series of Worldwide Surveys. Comparing substance use over time is useful, but researchers and policymakers should recognize the limitations of such analyses in drawing any policy conclusions. The data from the Worldwide Surveys are cross-sectional, not longitudinal, and come from different populations due to the high turnover in military personnel. Many individuals serving in the military in 1980, 1982, 1985, and 1988 were no longer in the military in 1992. 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 have been caused in part by effective substance use and health promotion programs and policies in the military, but they may also have been caused in part by differences in characteristics, attitudes, and values of the

populations being surveyed. Where possible, we investigated the validity of these alternative explanations of observed changes.

In particular, changes in substance use patterns may have been due in part to changes in the sociodemographic composition of the military since 1980. Specifically, the military force is now somewhat older, has more officers, has more married personnel, and is better educated than in 1980--factors that in previous Worldwide Surveys have also been associated with a lower likelihood of substance use. Therefore, we used standardization techniques (described in more detail in Appendix F) to create adjusted estimates of heavy alcohol, other drug, and cigarette use for each of the survey years since 1980, as though the military population in each of these subsequent survey years had the same age, educational, and marital status distribution as in 1980. Although these adjusted estimates are constructed estimates, they allow us to determine whether observed changes in substance use rates over the past 12 years can be explained by changes in the demographic composition of the Services. In Chapter 3, we present both unadjusted (i.e., observed rates) and adjusted rates of substance use across the survey years for the total DoD.

In Chapters 4 through 6, where we present estimates of the prevalence of heavy drinking, illicit drug use, and cigarette smoking, respectively, we provide two different estimates, unadjusted and adjusted, each of which addresses a different issue. First, we provide estimates of the magnitude of heavy drinking, illicit drug use, and cigarette smoking for each of the Services. These unadjusted or "raw" estimates indicate self-reported levels of substance use, but do not take into account differences in the sociodemographic composition among the Services. Unadjusted estimates indicate observed substance use rates and identify the challenge 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 are likely to be a function of the demographic composition of the Services. For example, as shown in Table 2.4, personnel in the Air Force tend to be older and better educated than personnel in the other Services. Since these characteristics are associated with lower rates of substance use, all other things being equal, we would expect the prevalences of heavy drinking, drug use, and smoking to be lower in the Air Force than in the other Services. Conversely, personnel in the Marine Corps tend to be male, age 25 or younger, and have a high school education or less. Because these factors are related to higher rates of substance use, all other things being equal, we would expect the prevalence of heavy drinking, illicit drug use, and smoking to be higher in the Marine Corps 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 between Services, we provide a second set of "adjusted" estimates using standardization procedures (see Appendix F). The "adjusted estimates" are not observed prevalence rates, but are constructed estimates that allow us to make comparisons among the Services as if each Service had the same sociodemographic composition. We used regression-based standardization procedures (Williams & LaVange, 1983) to adjust the 1992 prevalence rates for each Service, to construct the rates that would be expected if each Service were to have the sex, age, education, race/ethnicity, and marital status distribution of the total DoD.

2.8 Statistical Techniques

Analytical techniques for this report included univariate crosstabulations, standardized comparisons, and multivariate regression analysis. Most of our analyses were descriptive crosstabulations of the responses from two or more variables. We assessed significant differences for data in these tables using t tests.

As mentioned above in Section 2.7, some of our analyses used standardized comparisons to help control for differences among groups being compared. In some cases, we standardized sociodemographic characteristics that are associated with substance use across the Services or across survey years and then made comparisons on the standardized estimates. In other analyses, we compared rates of military and civilian populations by standardizing the civilian data to match the demographic distribution of the military, and then computed new civilian rates for the standardized population. The standardized comparisons used a combination of direct and regression-based standardization techniques (see Appendix F).

In multiple regression analysis, independent variables are examined to determine how well they can account for or explain the variation that occurs in the criterion variable of interest. Generally, the size of the estimated regression parameters associated with each variable indicates the importance of the variable in predicting the criterion measure. The advantage of regression analysis over two-way descriptive tables is that it permits examination of the effects of variables of particular interest (e.g., drinking levels) on outcome measures (e.g., number of negative consequences) while controlling for the effects of the remaining variables in the analysis. We have assessed significant effects using F tests and t tests.

Most of our regression models had binary dependent variables (e.g., drug use versus no drug use in past 12 months) and, consequently, we used logistic regression rather than ordinary regression in these cases. In logistic regression, the natural log of the odds (i.e., ln p/1-p) rather than the probability itself is modeled as a linear function of the independent variables. Ordinary multiple regression analysis models the probability as a linear function of the independent variables. The parameters of a multiple

regression model reflect changes in probabilities due to changes in the independent variable. The parameters of a logistic regression model are transformed to reflect relative changes in the odds due to changes in the independent variables.

The advantages of logistic regression over ordinary regression in the case of binary dependent variables are: ordinary regression can lead to negative predicted probabilities while logistic regression cannot; logistic regression allows for a nonlinear relationship between the independent variables and the dichotomous outcome; and ordinary regression analysis assumes that the error variance is constant and normally distributed while logistic regression makes the appropriate assumption that the error variance varies as a function of the predicted probability and has a binomial distribution.

When a logistic regression model is in its natural form, its parameters indicate the 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, the regression parameter indicates the difference in the log odds between the category coded 1 and the category coded 0 for that independent variable. An estimated parameter that is not significantly different from 0 indicates that the associated independent variable is not associated with the probability of the outcome occurring; 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(B)), 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 ratio of the odds of the outcome occurring for the category coded 1 to the odds of the outcome occurring for the category coded 0.

We fitted regression models separately for enlisted males, enlisted females, and officers. We did not analyze female officers separately because the sample size was too small to generate precise parameter estimates. Previous analyses fitted a single model either to the total sample or to the total enlisted sample. In Chapters 4 (alcohol use), 5 (drug use), and 6 (tobacco use) we present results of logistic regressions. We modeled each outcome variable as a function of demographic variables only and again as a function of both demographic, behavioral, and social/psychological variables. In the main text we present and discuss only the results of the full model, which includes demographic, behavioral, and social/psychological variables. However, we do compare the results of the full model to the demographic model. We have included the detailed results of both types of models in Appendix F. In Chapter 7 (negative effects of alcohol and drug use), we present results of ordinary regression analyses.

2.9 Variability and Suppression of Estimates

Tables 2.4, 2.5, and those 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. We can compute the 95% confidence interval by adding to and subtracting from the estimated proportion the result of multiplying 1.96 times the standard error for that cell. The confidence interval range means that, if we were to repeat the study 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.

In this report, we omitted estimates that were considered to be unreliable. More specifically, we suppressed 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. The rules for classifying estimates as unreliable are explained in Section C.4 of Appendix C. Unreliable estimates that were omitted are noted by a "+" in the tables. Very small estimates (i.e., <0.05%) that were not suppressed by the rules, but that rounded to zero, were also omitted from the tables and are shown as two asterisks (**).

3. OVERVIEW OF TRENDS IN SUBSTANCE USE, NEGATIVE EFFECTS, AND HEALTH PRACTICES

A major objective of the Worldwide Survey series is to monitor the prevalence and trends in use of alcohol, other drugs, and tobacco; associated negative effects; and health behaviors among military personnel. In this chapter we provide a brief overview of prevalence findings from the 1992 Worldwide Survey and examine the trends in substance use, negative effects associated with alcohol use and other drug use, and health practices across the series of Worldwide Surveys. These findings are discussed in more detail in later chapters along with information about the correlates of substance use, relationship of substance use and health, programmatic issues, and other topics.

3.1 Trends in Substance Use

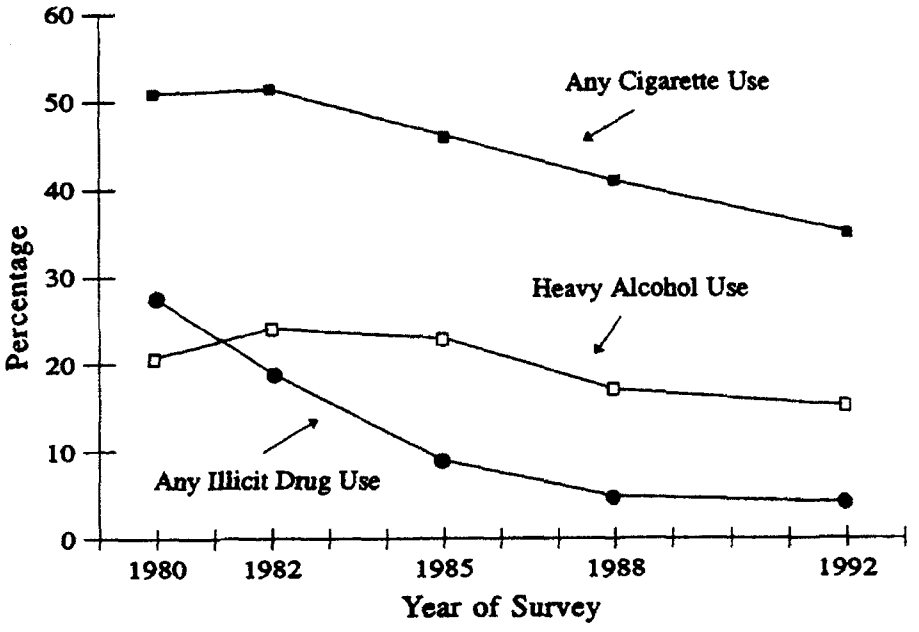
Prior surveys of military personnel and civilians have documented a decrease in the prevalence of use of alcohol, other drugs, and tobacco during the 1980s and continuing into the 1990s (e.g., Bray et al, 1988; Johnston, O'Malley, & Bachman, 1991; NIDA, 1991a). For cigarette smoking, this is a reflection of a longer-term trend toward lower rates of use that began after the first report of the Surgeon General's Advisory Committee was released in 1964; for alcohol and other drug use, the decrease is more recent. Data from the 1992 Worldwide Survey support the finding of a continuing downward trend in use of alcohol, other drugs, and tobacco among military personnel.

Figure 3.1 presents the trends over the five Worldwide Surveys of the percentage of the total active military force during the past 30 days who engaged in heavy alcohol use, any illicit drug use, and any cigarette use. Table 3.1 presents the observed rates of use of the three substances for the five survey years and information about the statistical significance of changes in substance use between each pair of survey years.[1] As shown, use of all three substances declined significantly between 1980 and 1992, although the rate of decline varied for each of the substances and between each of the five surveys.

The prevalence of heavy alcohol use declined significantly from 20.8% for all military personnel in 1980 to 15.2% in 1992. When we examine the trend over each of the five surveys, we see that heavy drinking was relatively stable from 1980 to 1985, decreased significantly between 1985 and 1988, and then remained at about the same level between 1988 and 1992. The prevalence of any other drug use during the past

[1]Special analyses of the Worldwide Survey in 1989 revealed a labeling error for drinking levels for the Worldwide Survey reports. Estimates for heavy drinking in these reports were for consumption of five or more drinks per typical drinking occasion at least twice a week, although those results were erroneously labeled as five or more drinks at least once a week. We present the corrected estimates of drinking levels for all of the survey years in this report. Thus, estimates of drinking levels differ from those presented in prior reports. Specifically, the numbers of heavy drinkers are larger than shown previously.

Figure 3.1 Trends in Substance Use, Past 30 Days, Total DoD, 1980-1992



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

30 days declined sharply from 27.6% in 1980 to 3.4% in 1992. The rate of decrease was much greater than for heavy alcohol use, and the decreases were statistically significant between each of the five surveys. The percentage of military personnel who smoked cigarettes also decreased during the 12-year period, from 51.0% in 1980 to 35.0% in 1992. Smoking rates remained nearly constant between 1980 and 1982, but decreased significantly between each of the later surveys.

Considered together, the trend data on substance use are notable in two regards. First, despite an overall statistically significant downward trend in use of all three substances between 1980 and 1992, only drug use declined significantly between each of the surveys. Second, illicit drug use and cigarette smoking declined significantly between 1988 and 1992, whereas heavy drinking did not. The finding of no significant decline since 1988 in heavy drinking suggests an area that may need greater emphasis by the military. Despite the lack of change in the rate of heavy drinking, there are, nonetheless, encouraging data about alcohol use. Table 3.1 shows a significant increase in the percentage of abstainers between 1988 and 1992 (17.2% vs 20.4%), a corresponding decrease in the percentage of moderate/heavy drinkers during the same period (28.8% vs 26.1%), but no significant change in the rate of heavy drinking (17.0% vs. 15.2%). Thus, although the rate of heavy drinking has remained relatively stable, the percentage of drinkers has decreased significantly (i.e., the abstainer rate has increased).

Table 3.1 Substance Use and Health Summary for Total DoD, 1980-1992

Measure	Year of Survey									
	1980		1982		1985		1988		1992	
Alcohol Drinking Levels										
Abstainer	13.5	(0.5)	11.8	(0.5)[b]	13.4	(0.6)[b]	17.2	(0.4)[b]	20.4	(0.8)[b,c]
Infrequent/light	12.1	(0.4)	17.6	(0.8)[b]	16.6	(0.7)	17.5	(0.5)	18.8	(0.5)[c]
Moderate	21.2	(0.7)	17.0	(0.5)[b]	18.6	(0.6)[b]	19.5	(0.5)	19.5	(0.5)[c]
Moderate/heavy	32.4	(0.6)	29.6	(0.6)[b]	28.5	(0.8)	28.8	(0.7)	26.1	(0.6)[b,c]
Heavy	20.8	(1.1)	24.1	(1.0)[b]	22.9	(1.1)	17.0	(0.9)[b]	15.2	(0.7)[c]
Any Drug Use*										
Past 30 days	27.6	(1.5)	19.0	(1.0)[b]	8.9	(0.8)[b]	4.8	(0.3)[b]	3.4	(0.4)[b,c]
Past 12 months	36.7	(1.5)	26.6	(1.0)[b]	13.4	(1.0)[b]	8.9	(0.8)[b]	6.2	(0.6)[b,c]
Cigarette Use, Past 30 Days										
Any smoking	51.0	(0.8)	51.4	(0.8)	46.2	(1.0)[b]	40.9	(0.8)[b]	35.0	(1.0)[b,c]
Heavy smoking	34.2	(0.6)	33.5	(0.7)	31.2	(0.8)[b]	22.7	(0.7)[b]	18.0	(0.5)[b,c]
Alcohol Use Negative Effects										
Serious consequences	17.3	(1.1)	14.6	(0.6)[b]	10.7	(0.9)[b]	9.0	(0.6)	7.6	(1.1)[c]
Productivity loss	26.7	(1.2)	34.4	(0.7)[b]	27.1	(1.1)[b]	22.1	(1.2)[b]	16.4	(1.4)[b,c]
Dependence	8.0	(0.6)	9.0	(0.5)	7.7	(0.7)	6.4	(0.5)	5.2	(0.4)[c]
Drug Use Negative Effects										
Serious consequences	13.3	(1.0)	6.2	(0.4)[b]	3.0	(0.4)[b]	1.8	(0.2)[b]	0.4	(0.1)[b,c]
Productivity loss	14.4	(1.1)	9.9	(0.5)[b]	3.4	(0.6)[b]	2.1	(0.4)	0.7	(0.2)[b,c]
Health Practices, Past 12 Months	-	(-)	-	(-)	3.79	(0.02)	3.91	(0.04)[b]	3.81	(0.04)

Note: Entries for health practices are mean values. Other entries are expressed as percentages (with standard errors in parentheses). Negative effects for alcohol and other drug use are reported for the past 12 months. Significance tests were done between consecutive survey years--e.g., 1980 and 1982--and between 1980 and 1992.

*Any nonmedical use of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs are also included for 1988 and 1992.

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

-Data are not available before 1985.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

We also examined the trends in substance use for each of the Services comparable to the data in Figure 3.1 for all military personnel. Figure 3.2 presents Service trends in substance use during the past 30 days between 1980 and 1992. Corresponding prevalence data appear in Appendix D, Tables D.1 to D.4.

Overall, as we show in Figure 3.2, the Services follow the DoD pattern of a downward trend between 1980 and 1992 of any illicit drug use and any cigarette use in the past 30 days. The Navy and Air Force also follow the DoD pattern of a significant decline from 1980 to 1992 in heavy drinking, whereas the Army and Marine Corps show more variability across the survey years. We examine these Service differences in more detail in Chapters 4, 5, and 6 for alcohol, other drugs, and cigarettes. Despite some variation from the DoD trend, the Services all show the same relative ranking of use of the substances: cigarette smoking had the highest rate, followed by heavy drinking, followed by illicit drug use.

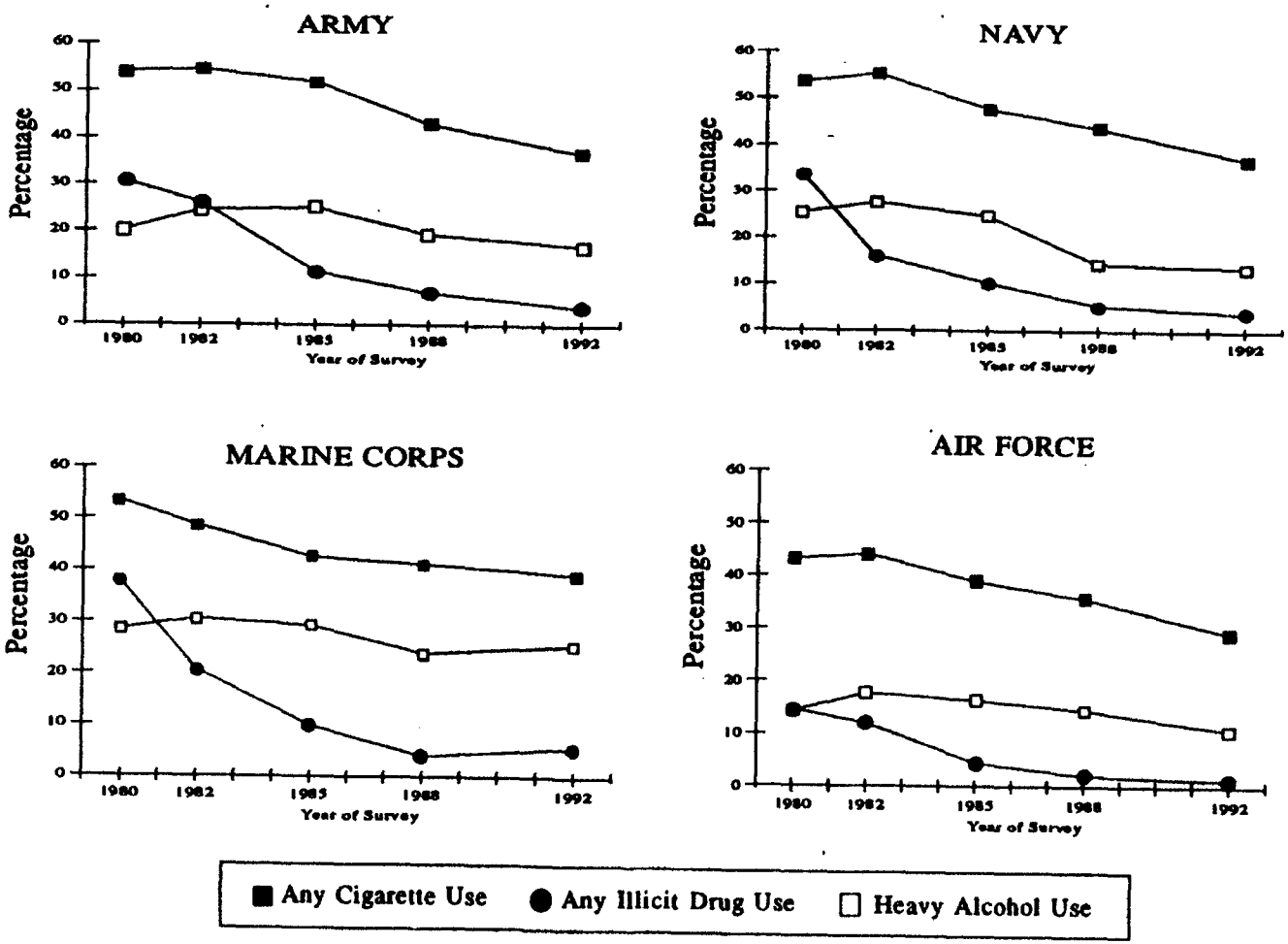
3.2 Trends in Substance Use Adjusted for Sociodemographic Differences

Although the downward trends shown in Figures 3.1 and 3.2 are encouraging, a question arises about whether these changes reflect progress by the military in combating the problem of substance abuse or whether they are the result of demographic changes that may have occurred in the military since 1980. Between 1980 and 1992 the military has enjoyed boom years for both recruiting and successful retention. As a result, the military now boasts a better-educated, higher-quality force than ever before. This success in the personnel arena has resulted in a force that is somewhat older, has more officers, has more married personnel, and is better educated than in 1980--factors that are also associated with less substance use.

To examine whether changes in demographic composition explain the pattern of results, we standardized or adjusted the rates of use for the 1982, 1985, 1988, and 1992 surveys to the age/education/marital status distribution for the 1980 survey. 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 demographic characteristics of the military from 1980 to 1992.

In Table 3.2 and Figure 3.3, we present the trends in unadjusted (i.e., observed) and adjusted (i.e., standardized) rates of heavy alcohol use, any illicit drug use, and cigarette smoking for the total DoD during the five surveys. In general, adjustments by standardization changed the estimates somewhat, but did not substantially alter the patterns of significant differences between surveys from 1980 to 1992. For heavy alcohol use, adjusted rates increased the estimates of heavy drinking for the 1982, 1988, and 1992 surveys by about two percentage points on average. That is, if the sociodemographic

Figure 3.2 Trends in Substance Use, Past 30 Days, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 3.2 Trends in Substance Use, Past 30 Days, Unadjusted and Adjusted by Sociodemographic Characteristics for Total DoD

Substance/Type of Estimate	Year of Survey				
	1980	1982	1985	1988	1992
Heavy Drinking					
Unadjusted	20.8 (1.1)	24.1 (1.0)[b]	22.9 (1.1)	17.0 (0.9)[b]	15.2 (0.7)[c]
Adjusted[a]	20.8 (1.1)	26.4 (0.8)[b]	23.9 (0.8)[b]	19.3 (0.9)[b]	18.9 (0.9)
Any Illicit Drug Use					
Unadjusted	27.6 (1.5)	19.0 (1.0)[b]	8.9 (0.8)[b]	4.8 (0.3)[b]	3.4 (0.4)[b,c]
Adjusted[a]	27.6 (1.5)	18.2 (0.7)[b]	9.7 (0.6)[b]	5.6 (0.4)[b]	4.3 (0.6)[c]
Cigarette Use					
Unadjusted	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[b]	40.9 (0.8)[b]	35.0 (1.0)[b,c]
Adjusted[a]	51.0 (0.8)	52.0 (0.6)	46.9 (0.8)[b]	42.9 (0.7)[b]	37.2 (0.8)[b,c]

Note: Estimates are percentages (with standard errors in parentheses). Significance tests were done between consecutive survey years--e.g., unadjusted estimates between 1980 and 1982; adjusted estimates between 1980 and 1982--and between 1980 and 1992.

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

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

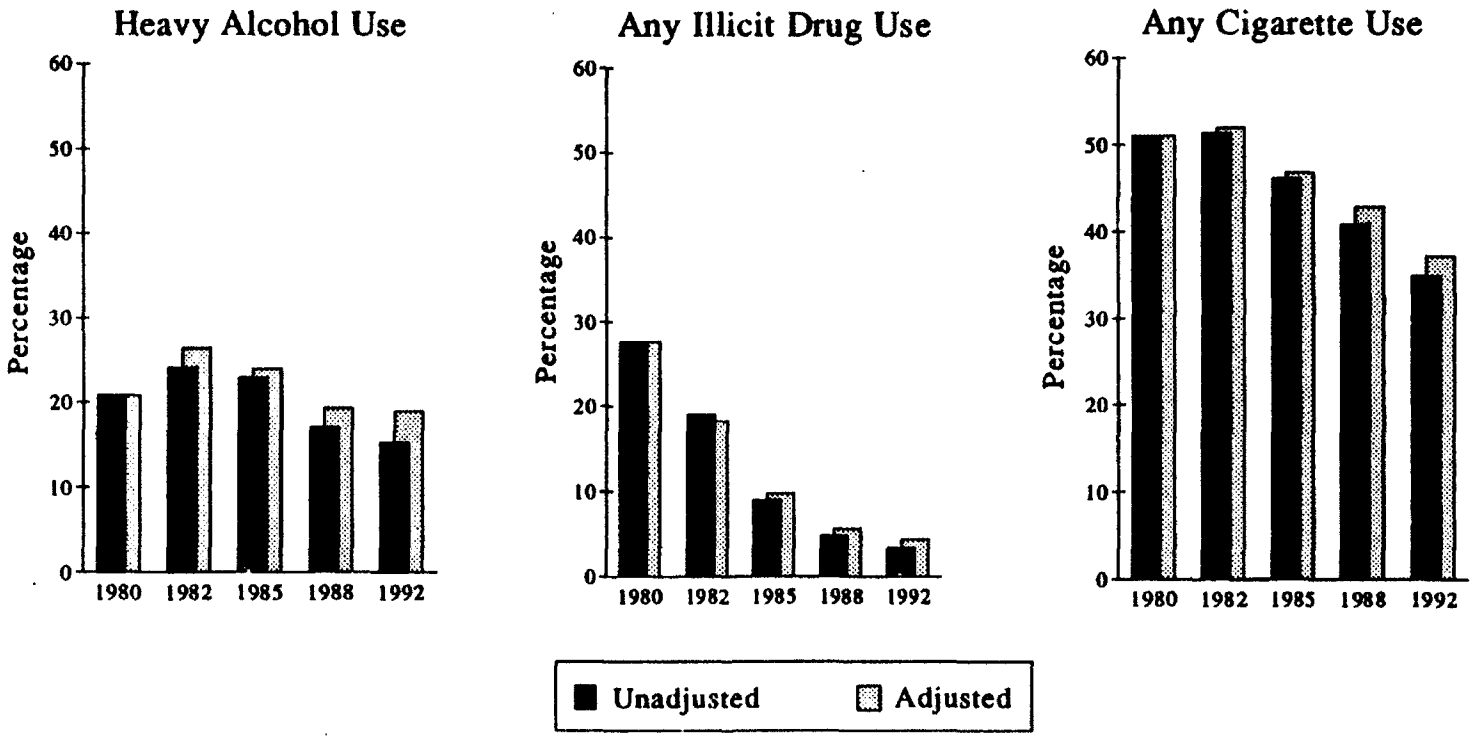
[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1980 to 1992.

composition of the military in 1982, 1988, and 1992 had been the same as in 1980, rates of heavy drinking would have been even higher than the observed rates. For adjusted rates, there was no significant decline in the rate of heavy drinking between 1980 and 1992, although there was for unadjusted rates.

The implication of the finding of no significant difference in adjusted rates is that military programs and practices have had little effect on rates of heavy drinking during the 12-year period from 1980 to 1992. This conclusion is subject to other interpretations, however. Both the adjusted and unadjusted data showed a significant increase in heavy drinking between 1980 and 1982 and adjusted data were significantly lower in 1992 than in 1982. This could be interpreted to mean that the military has made significant progress in reducing heavy drinking, from 26.4% in 1982 to 18.9% in 1992 (adjusted rates), that cannot be explained just by demographic changes. Another view consistent with historical events is that the 1982 increase in heavy drinking is an anomaly that may reflect substitution to alcohol when the initial crackdown on illicit drug use began. This notion suggests that rates of heavy drinking have merely fluctuated around a base level observed in 1980. In either case, the adjusted data indicate that when demographics of the military were considered, rates of heavy drinking in 1992 were about the same as they were in 1980.

Figure 3.3 Trends in Substance Use, Past 30 Days, Total DoD, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1992



Note: Adjusted estimates have been standardized to the 1980 distribution by age, education, and marital status.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

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 strong significant downward trend in use as the unadjusted data between 1980 and 1992. 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 between 1980 and 1992.

3.3 Trends in Negative Effects

The substantial negative consequences of alcohol and other drug use on the work performance, health, and social relationships of military personnel have been a continuing concern assessed in the Worldwide Surveys. In this section, we compare the trends in negative effects for the five Worldwide Surveys.

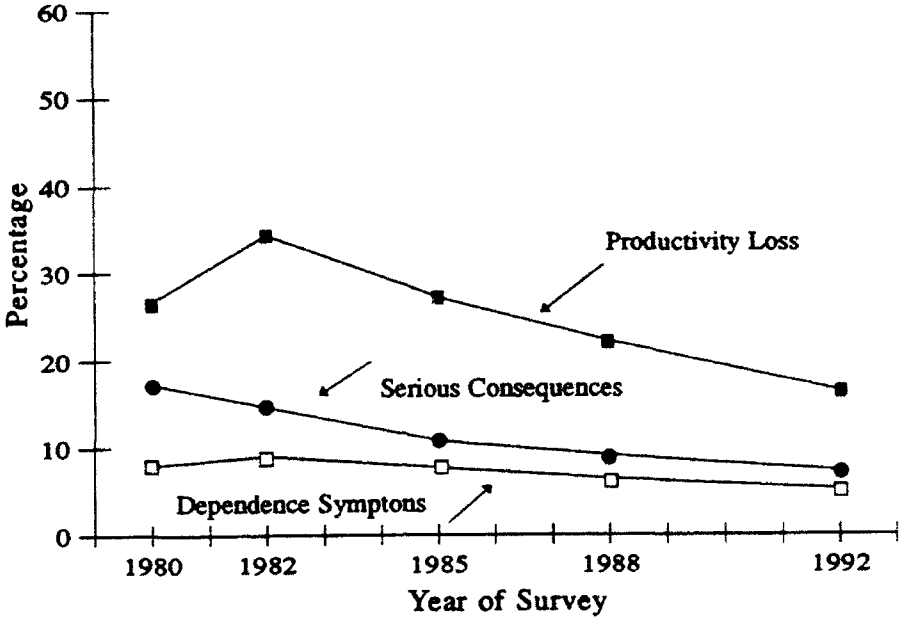
3.3.1 Alcohol-Related Negative Effects

In Figure 3.4, we present trends in alcohol-related negative effects for the total DoD between 1980 and 1992. In view of the decline in heavy drinking between 1980 and 1992 observed in Figure 3.1, we anticipated a decline in negative effects due to drinking. Results confirmed our expectation. In 1980, 17.3% of military personnel experienced one or more serious consequences associated with alcohol use during the year. This figure declined to 7.6% in 1992. In Figure 3.4, results for serious consequences show a steady downward decline across the years. The 1980-92 decrease was statistically significant, as were the decreases between 1980 and 1982, and between 1982 and 1985. Declines since 1985 have been more moderate and have not been significantly different from those of the preceding survey year.

Alcohol use productivity loss, also shown in Figure 3.4, decreased significantly between 1980 and 1992, from 26.7% to 16.4%. The pattern of change for this measure differs from the other measures in this figure in that it shows a significant increase between 1980 and 1982 (consistent with the increase in heavy drinking between 1980 and 1982 noted above) and a significant decrease for each survey thereafter. The 1992 rate was approximately half the size of the rate observed at its peak in 1982.

We found fewer substantial decreases in the percentage of military personnel reporting symptoms of alcohol dependence between each of the surveys, although there was a significant decline over the 12-year period. In 1980, as shown in Figure 3.4, 8.0% of total DoD personnel indicated that they had experienced symptoms of dependence during the past year compared to 5.2% in 1992.

Figure 3.4 Trends in Alcohol Use Negative Effects, Total DoD, 1980-1992



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

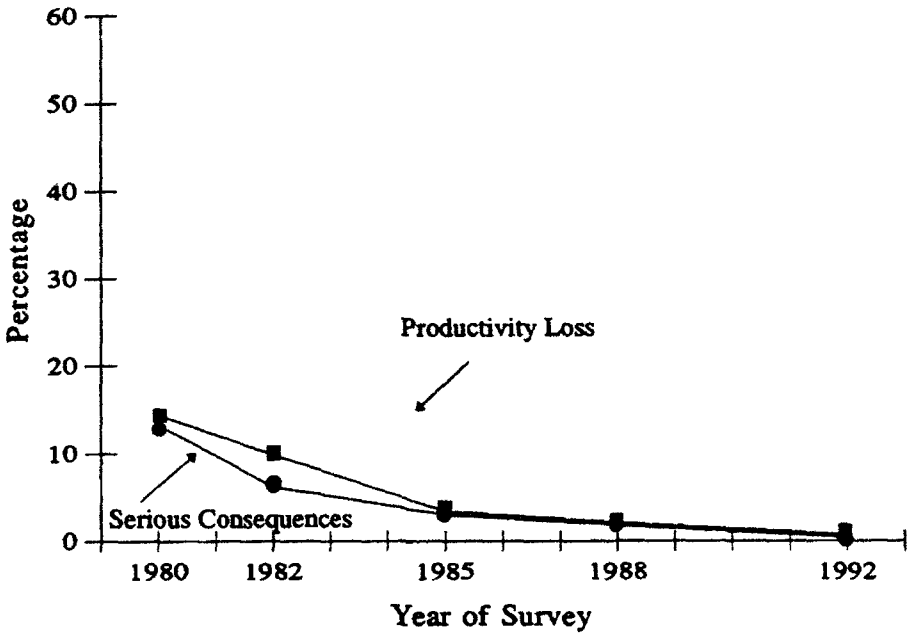
3.3.2 Drug-Related Negative Effects

Figure 3.5 shows that the prevalence of drug-related negative effects for all DoD personnel decreased substantially between 1980 and 1992. In 1980, 13.3% of military personnel reported experiencing a drug-related serious consequence during the year; by 1992, only 0.4% reported this. The decreases were statistically significant between each of the survey years.

The percentage who reported experiencing productivity loss associated with illicit drug use also decreased significantly between 1980 and 1992, from 14.4% of all military personnel to 0.7%, as shown in Figure 3.5. For the individual surveys, the rates showed statistically significant declines between 1980 and 1982, 1982 and 1985, and 1988 and 1992; the small decrease between 1985 and 1988 was not significant.

These declines in drug-related negative effects between 1980 and 1992 reflect the substantial declines in drug use during the same period (Figure 3.1). By 1992 the percentage of military personnel reporting any serious consequences or productivity loss associated with drug use was minimal. (Because of the small number of drug users, we did not compute a measure of drug dependence symptoms.)

Figure 3.5 Trends in Drug Use Negative Effects, Total DoD, 1980-1992



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

3.4 Trends in Health Practices

Beginning in 1985, the Worldwide Survey first monitored the involvement of military personnel in health practices that encourage sound health and good work performance. We considered six health practices: drinking moderately or less; not using drugs; never smoking cigarettes; exercising twice a week or more; eating two full meals a day at least 5 days per week; and sleeping 6 or more hours a day at least 5 days a week.

In Table 3.1, we present data for a summary measure of health practices that shows the average number of the six practices engaged in during the past 12 months for the 1985, 1988, and 1992 surveys. In 1985, military personnel on average reported that they had engaged in 3.79 out of 6 health practices during the past year. In 1988, there was a small but statistically significant increase to 3.91 health practices, but then in 1992, the average number of practices was 3.81, a nonsignificant change from 1988, but a level approximately the same as for 1985. Overall the level of involvement in the specific health practices we examined has been remarkably stable for the past 6 years. On average, military personnel engaged in nearly four out of six practices.

The overall trend in health practices for the Services was similar to the DoD pattern (Tables D1-D4). The Army, Navy, and Marine Corps showed increases in the

number of health practices from 1985 to 1988 and comparable decreases in 1992 back to the 1985 level. Although the pattern of changes was consistent, only some of the differences were statistically significant. In contrast to the other Services, Air Force involvement with health practices has been constant across the three surveys, and has been somewhat higher than for the other Services (3.95). In addition to these health practices, we discuss health behavior findings for the Services more fully in Chapter 10.

3.5 Summary

3.5.1 Trends in Use of Alcohol, Other Drugs, and Cigarettes

Comparisons of findings from five Worldwide Surveys of military personnel conducted in 1980, 1982, 1985, 1988, and 1992 show a downward trend in the use of alcohol, other drugs, and cigarettes. Specifically, during the past 30 days for total DoD (see Figure 3.1 and Table 3.2):

- Use of any illicit drug declined sharply from 27.6% in 1980 to 3.4% in 1992;
- Heavy drinking declined significantly from 20.8% in 1980 to 15.2% in 1992; and
- Cigarette smoking decreased significantly from 51.0% in 1980 to 35.0% in 1992.

Comparisons of findings from the 1988 and 1992 surveys show tha the rates of illicit drug use and cigarette smoking declined significantly, whereas the rate of heavy drinking did not.

- Although heavy drinking did not decrease significantly between 1988 and 1992, the overall rate of alcohol use did decline significantly from 82.8% to 79.6%, primarily due to a decrease in the rate of moderate/heavy drinking from 28.8% to 26.1% (Table 3.1).

3.5.2 Trends in Substance Use Adjusted for Sociodemographic Differences

Members of the armed forces in 1992 were more likely to be older, to be officers, to be married, and to have more education than in 1980--factors that are also associated with less substance use. To examine whether changes in demographic composition explained declines in substance use across survey years, we standardized or adjusted rates of use for the 1982, 1985, 1988, and 1992 surveys 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 demographic characteristics of the military from 1980 to 1992.

- For illicit drug use and cigarette smoking, adjusted data showed the same strong significant downward trend in use as the unadjusted data between 1980 and 1992 (Figures 3.2 and 3.3). This indicates that the declines in use between surveys were not explained by shifts in the sociodemographic composition of the military population.

- Adjusted rates showed no significant decline in the rate of heavy drinking between 1980 and 1992. This contrasts with the decline observed for the same period for unadjusted rates. It suggests that if the demographic composition of the military in 1992 were like the composition in 1980, rates of heavy drinking between these two survey years would have been about the same.

3.5.3 Negative Effects

We also found significant declines in the percentage of military personnel experiencing alcohol- and drug-related negative effects (Figures 3.4 and 3.5).

- For alcohol use, we observed significant declines from 1980 to 1992 in serious consequences experienced during the past year (17.3% to 7.6%), productivity loss during the past year (26.7% to 16.4%), and dependence symptoms during the past year (8.0% to 5.2%).

- For drug use, we observed significant declines from 1980 to 1992 for serious consequences during the past year (13.3% to 0.4%) and productivity loss during the past year (14.4% to 0.7%).

3.5.4 Health Practices

At the same time that the use of alcohol, other drugs, and tobacco and alcohol- and drug-related negative effects decreased, military personnel were involved on average in about four out of six positive health practices (Table 3.1). This was about the same number as in the 1988 survey.

Overall, these findings indicate that the military has made steady and notable progress during the past 12 years in combating illicit drug use and smoking and in reducing drug- and alcohol-related problems. DoD has made less progress in reducing heavy drinking. These findings are consistent with the military's strong emphasis on the reduction of drug abuse that began in the early 1980s and cessation of smoking that began during the mid-1980s.

Despite notable progress, there is still room for considerable improvement in some areas. Cigarette smoking remains common, affecting about one in every three military

personnel, and the rate of heavy drinking--the consumption level most likely to result in alcohol-related problems--affects about one in seven active duty personnel. Further, when we adjusted the estimates of heavy drinking to reflect changes in the sociodemographic composition of the military, we found that the 1992 rate had not changed significantly from the 1980 rate. This finding suggests that the observed declines in heavy drinking from 1980 to 1992 (unadjusted rates) were largely a function of changes in the demographic composition of the military.

4. ALCOHOL USE

This chapter presents detailed analyses of alcohol use among military personnel; we examine the prevalence and trends in alcohol use, patterns of use, correlates of use, aspects of the military job related to use, and military/civilian comparisons of use. As described in Chapter 2, we have defined alcohol use in terms of both absolute ounces of alcohol (i.e., ethanol) consumed and drinking levels.

4.1 Prior Studies

A number of surveys of civilian and military populations conducted over the past decades (described below), coupled with longer-term information about alcohol sales, have indicated that most Americans drink alcoholic beverages, but there are now fewer drinkers and they are drinking less. There is also some evidence of an increase in heavy drinkers among young people in their twenties and a small increase in persons who are alcohol dependent. Despite these changes, drinking patterns on the whole have been more stable than patterns of drug use or cigarette use, which have shown substantial declines. Prior studies of alcohol use, based primarily on civilian populations and intensified efforts in the military to deglamorize alcohol use, led us to expect that patterns of alcohol use among military personnel in 1992 would be similar to those observed in the late 1980s, perhaps with slight increases in the proportion of abstainers and heavy drinkers and decreases in the overall level of consumption.

4.1.1 Overview of Consumption Patterns

The average yearly per capita consumption of alcohol (i.e., ethanol) in the United States has declined steadily since 1981, to an average of 2.54 gallons in 1987 (NIAAA, 1990, p. 13). Per capita consumption is expressed in terms of gallons of pure ethanol calculated from sales of beer, wine, and spirits divided by the total population aged 14 and older. A major portion of the overall decrease was related to the decrease in per capita consumption of spirits, the lowest since 1958. Beer consumption also decreased and in 1987 was the lowest since 1978. Wine consumption had increased over the past decade, but was relatively stable between 1986 and 1987. Thus, not only had alcohol consumption decreased overall but the preference for beverage types changed as well. Distilled spirits declined in popularity in favor of beverages with lower alcohol content--beer and wine. These changes in alcohol consumption are often attributed to an increasing awareness of the health risks associated with alcohol use, increases in the proportion of the population over age 60 (among whom rates of drinking are relatively low), and an overall increase in emphasis on healthy lifestyles (NIAAA, 1987, p. 14).

These findings of a decrease in per capita consumption of ethanol that are based on alcohol sales data are mirrored by findings from surveys of civilian and military populations, as described in more detail below.

4.1.2 Patterns in Civilian Populations

Information about alcohol use in the civilian population is gathered primarily by means of periodic surveys of youth and adult populations conducted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA). The major survey series are national alcohol surveys funded by NIAAA in 1964 (Cahalan, Cisin, & Crossley, 1969), 1979 (Clark & Midanik, 1982), 1984 (Clark & Hilton, 1991), and 1990 (Midanik & Clark, 1992); the National Household Survey on Drug Abuse (NHSDA) survey series conducted periodically between 1972 and 1991, and continuing (NIDA, 1991a and b); and the High School Senior Survey series, conducted annually between 1975 and 1991 and continuing (Johnston, O'Malley & Bachman, 1991). Additional information about drinking patterns among those aged 18 and older is available in the 1985 National Health Interview Survey (Williams, Dufour, & Bertolucci, 1986).

Direct comparison of findings across the surveys is somewhat difficult because of differences in measurement of drinking behavior and associated problems and because of differences in populations surveyed (particularly differences in ages surveyed) and in survey methods (face-to-face household survey, self-administered in-school survey). Therefore, we simply present an overview of the findings from each of these survey series.

Comparisons of the national alcohol surveys in 1967 and 1984 and related surveys of alcohol use are presented in Clark and Hilton (1991). For the sake of comparison across the two surveys, most comparisons were limited to those aged 23 and older. They based their analyses on a typology of alcohol use that took into account the number of drinks consumed in the past month as well as the amount per occasion, including atypical drinking occasions. Comparisons between 1967 and 1984 showed that alcohol consumption was relatively stable on an overall level although consumption shifted from distilled spirits to beer and wine. For men and women together, there were no significant differences in drinking patterns. However, looking more closely at the drinking patterns of men and women separately showed no significant differences for women, but a significant increase for men in the percentage of abstainers, from 20% in 1967 to 25% in 1984. More women than men were abstainers in each age group, and for both men and women the percentage of abstainers was higher with increased age. In 1984, 23% of men were in the category of high volume/high maximum consumption per occasion, compared with 6% of women. That is, they drank 45 or more drinks per month and 5 or more drinks per occasion at least once in a while. Differences among other demographic groups were not substantial or consistent, and patterns of use among demographic groups had

not changed substantially. More men than women reported experiencing drinking problems or dependency symptoms in 1984. For both men and women the percentage reporting drinking problems was relatively stable between 1967 and 1984, but the percentage reporting dependency symptoms increased significantly.

Preliminary findings from the 1990 survey suggest an increase in the percentage of abstainers (from 30% in 1984 to 35% in 1990) and a decrease in the percentage of the population reporting weekly drinking (from 29% in 1984 to 23% in 1990). However, the prevalence of heavy drinking has remained fairly constant between these two survey years (Midanik & Clark, 1992).

These findings suggest that drinking patterns have been relatively stable for more than 20 years, although the number of abstainers is increasing among men and alcohol-dependent drinkers are increasing among both men and women. The finding of no substantial decreases in overall consumption is in consistent with alcohol sales data, but may be an artifact of the lack of survey items about highest-volume drinking occasions.

In 1991, according to the most recent NHSDA, some 50.9% of the household population aged 12 and older drank alcohol in the past month, or 58.1% of men and 44.3% of women (NIDA, 1991b). More detailed analyses are available for the 1990 survey (NIDA, 1991a). These findings show that in 1990 some 51.2% of the total household population were current drinkers (i.e., consumed any alcohol in the past month). Men were much more likely than women to be current drinkers (58.9% of men; 44.1% of women). Thus, the percentages of current drinkers were essentially the same in 1990 and 1991, and were slightly lower than the 53.4% of all household residents, 60.6% of men, and 46.7% of women who were current drinkers in 1988. About 5% of the household population in 1990 were heavy drinkers (i.e., drank 5 or more drinks per occasion on 5 or more days in the past month; 8.5% of men and 1.7% of women). The percentage of current drinkers among those aged 18 to 25 was 69% in 1974, peaked at 76% in 1979, and decreased to 64% in 1991. Similar trends were found among those aged 26 and older, with the percentage of current drinkers at 54% in 1974, peaking at 61% in 1979, and decreasing to 50% in 1991.

These findings also suggest an increase in the percentage of abstainers but a relative stability in the percentage of heavy drinkers. No data on the overall volume of ethanol consumption are available from the NHSDA.

Data on the use of illicit drugs, alcohol, and cigarettes are available from the High School Senior Survey, conducted annually since 1975, and the related survey of college age persons. Johnston, O'Malley, and Bachman (1991) found that in 1990, although drinking was illegal for virtually all high school students and most college students, almost all high school seniors (90%) had tried alcohol. More importantly, substantial

proportions of high school seniors and college students--32% of seniors and 41% of college students--were heavy drinkers. That is, they reported drinking five or more drinks in a row at least once in the past 2 weeks. However, current alcohol use among high school seniors decreased from 72% in 1980 to 57% in 1990, while daily use decreased from 6.9% in 1979 to 3.7% in 1990. On the other hand, college students showed less decrease in monthly drinking rates and no change in daily drinking rates. In 1991, further decreases were found; some 54% of high school seniors were current drinkers and 3.6% were daily drinkers. Some 75% of college students were current drinkers (University of Michigan, January 25, 1992).

Data from the 1985 supplement to the National Health Interview Survey (the Health Promotion and Disease Prevention Questionnaire) showed that 76% of men and 56% of women were current drinkers. Some 13% of men and 3% of women were classed as heavy drinkers (they consumed 1 or more ounces of ethanol per day). Drinkers were more common among younger adults, those with a high school education or more, and those with higher incomes. The percentage of heavier drinkers differed little across these age groups (Williams, Dufour, & Bertolucci, 1986).

Despite differences in survey items and measures of alcohol, these civilian surveys indicate the relative stability of alcohol patterns overall but a decrease in the percentage of drinkers. Some studies have suggested that the percentage of heavy drinkers has remained relatively stable.

4.1.3 Patterns in Military Populations

The primary source of information about alcohol use among military personnel is the Worldwide Survey series, although several of the individual Services have also conducted surveys. The Worldwide Survey, previously conducted in 1980, 1982, 1985, and 1988, provides information about alcohol use among all active duty DoD personnel as well as among members of the four Services.

Findings from the Worldwide Survey series largely support the findings of the civilian surveys discussed above. Between 1980 and 1988, both the overall amount of alcohol consumed and the percentage of military personnel who were heavy drinkers decreased to the lowest point since 1980. The average amount of ethanol consumed per day decreased steadily from 1.48 ounces in 1980 to 0.96 ounces in 1988, a decrease of 35% in 8 years. The percentage of heavy drinkers decreased from 20.8% to 17.0%. At the same time, the percentage of abstainers increased from 13.5% to 17.2%. In 1988, some 83% of military personnel were current drinkers.

4.1.4 Military and Civilian Comparisons

Although the findings from military surveys are generally consistent with findings from civilian surveys, the percentage of current drinkers and heavy drinkers in the military has tended to be higher than among civilians. Part of this difference no doubt is due to differences in the sociodemographic composition of military and civilian populations. Military populations are disproportionately young and male, factors both associated with higher rates of alcohol use. Thus, valid comparisons of rates of alcohol use among military personnel and civilians require that analyses control for sociodemographic differences for these two populations (i.e., standardization). Because of such differences, we expected unstandardized rates of military personnel to be somewhat higher than civilian rates. Further, some conditions of military life (such as separation from spouse or family and location in isolated areas) may foster higher rates of drinking.

Other researchers have conducted military/civilian comparisons of use. These include comparisons of rates of problem drinking among Air Force personnel with Army and Navy personnel and civilians (Polich & Orvis, 1979), analyses of the Worldwide Survey data presented in the final reports for the 1980, 1982, and 1985 surveys (Burt, Biegel, Carnes, & Farley, 1980; Bray et al., 1983; and Bray et al. 1986), and more detailed analyses of the 1985 Worldwide Survey and NHSDA data (Bray, Marsden, & Wheeless, 1989; see also Bray, Marsden, & Peterson, 1991).

Polich and Orvis (1979) showed that unstandardized rates of problem drinking were substantially higher among Army and Navy personnel than among civilians and that rates among Air Force personnel were only slightly higher than among civilians. Standardization for education, age, marital status, and location of residence reduced the military/civilian differential by about 50%. The standardized Army and Navy rates, however, remained higher than civilian rates, while the Air Force and civilian rates were nearly equal. Burt and associates (1980) standardized the 1979 civilian population for sex, age, marital status, and education to approximate the demographic distribution of the 1980 Worldwide Survey population. They found that slightly higher proportions of military personnel than civilians drank any alcohol. Using a comparable standardization procedure with civilian data from the 1982 NHSDA, Bray et al. (1983) found that the prevalence of alcohol use was higher among military personnel than among civilians for males aged 18 to 25. While these two analyses of Worldwide Survey data were limited to alcohol prevalence data, Bray et al. (1986) compared current drinkers and those who consumed 1 or more ounces per day of absolute alcohol among military personnel and civilians. Overall, military personnel in selected age groups were more likely than civilians to drink; military personnel under age 35 were more likely than civilians to drink 1 or more ounces per day and military personnel over age 35 were less likely to do so.

Analyses of the 1985 Worldwide Survey and 1985 NHSDA data by Bray, Marsden, and Wheeless (1989) and Bray, Marsden, and Peterson (1991) present more definitive comparisons of alcohol use patterns among military personnel and civilians. Using measures of any alcohol use as well as heavy drinking and negative consequences associated with alcohol use, they conducted standardized comparisons for all military personnel and civilians as well as selected age groups and for males and females separately. Standardized comparisons of alcohol use among military personnel and civilians showed that military personnel were in general more likely to drink and to drink heavily and that the differences were especially pronounced among younger persons. Military personnel overall were also more likely to have alcohol-related negative experiences, but results for younger female military personnel and older male military personnel were more similar to those for civilians.

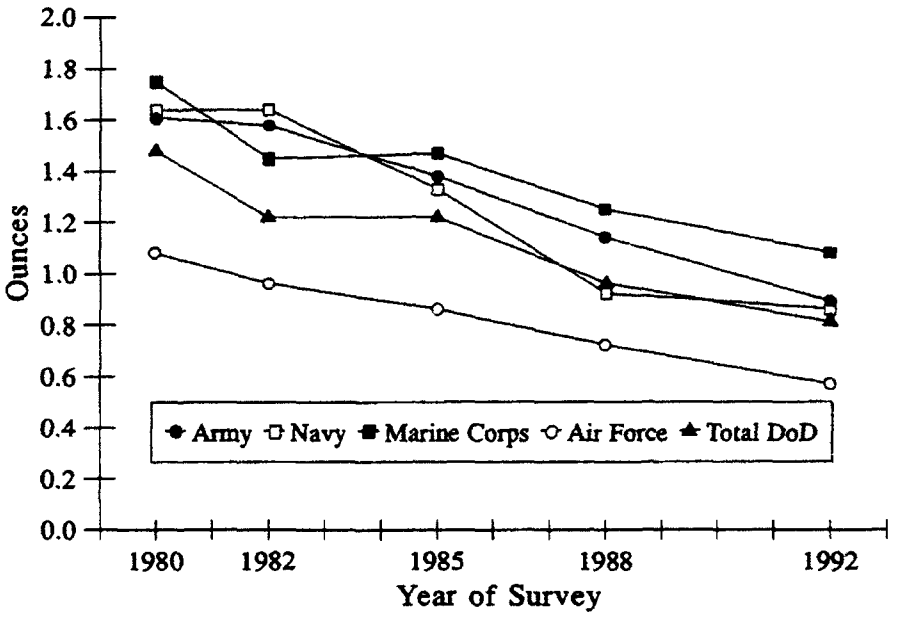
These analyses have shown that military personnel were in general more likely than civilians to drink and to drink heavily and to have negative experiences because of their drinking. These differences remained after sociodemographic characteristics that defined differences between military and civilian populations were controlled for.

4.2 Trends in Alcohol Use

As discussed above, prior studies of alcohol use among military and civilian populations as well as alcohol sales data indicate that although alcohol use patterns have been relatively stable in comparison with illicit drug use and tobacco use, consumption has decreased overall. There has been a slight increase in the percentage of abstainers, and the percentage of heavy drinkers may have been more stable. Figure 4.1 (see also the unadjusted portion of Table 4.1) shows that the average amount of ethanol consumed per day has decreased substantially since 1980, for all DoD personnel as well as for personnel from the individual Services. For the total DoD, the amount decreased from 1.48 ounces per day in 1980 to 1.41 in 1982, 1.22 in 1985, 0.96 in 1988, and 0.81 in 1992. This represents a 45% decrease over the 12-year period. The decreases from 1982 to 1985, from 1985 to 1988, and from 1988 to 1992 were statistically significant. These decreases, greater during the latter part of the period, are consistent with the more recent emphasis on the military's deglamorization of alcohol use.

Over the 12-year period, alcohol consumption among members of each of the individual Services also decreased substantially (see Figure 4.1 as well as the unadjusted portion of Table 4.1). We observed significant decreases of 48% for Navy personnel, 47% for Air Force personnel, 45% for Army personnel, and 38% for Marine Corps personnel.

Figure 4.1 Trends in Average Daily Ounces of Alcohol (Ethanol) Consumed, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Consumption was highest among Marine Corps personnel and lowest among Air Force personnel in both 1980 and 1992. Consumption among Air Force personnel was by far the lowest of all the Services in each of the survey years.

However, the observed decreases in alcohol consumption may partially reflect changes in the sociodemographic composition of the military population over time. Over the past decade, the military population has become slightly older and more likely to be married, factors both related to lower levels of alcohol use. To examine whether the observed decreases in alcohol use were associated with changes in sociodemographic composition of the Services, we adjusted estimates from the 1982 through the 1992 surveys to take into account demographic changes since 1980. We standardized the demographic distributions of the military population from the 1982 to 1990 surveys to the 1980 age, education, and marital status distribution for each Service and the total DoD. These results are presented in Table 4.1. (See Appendix F for a discussion of standardization procedures.) These adjusted estimates are constructed estimates and are not the actual, observed prevalence estimates for these survey years.

Table 4.1 Trends in Average Daily Ounces of Ethanol Consumed, Past 30 Days, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1992

Service/Type of Estimate	Year of Survey				
	1980	1982	1985	1988	1992
Army					
Unadjusted	1.61 (0.10)	1.58 (0.08)	1.38 (0.12)	1.14 (0.06)	0.89 (0.06)[b,c]
Adjusted[a]	1.61 (0.10)	1.51 (0.06)	1.50 (0.11)	1.21 (0.04)[b]	1.09 (0.05)[c]
Navy					
Unadjusted	1.64 (0.12)	1.64 (0.12)	1.33 (0.10)	0.92 (0.06)[b]	0.86 (0.10)[c]
Adjusted[a]	1.64 (0.12)	1.58 (0.09)	1.46 (0.09)	1.02 (0.06)[b]	0.94 (0.10)[c]
Marine Corps					
Unadjusted	1.75 (0.09)	1.45 (0.09)[b]	1.47 (0.22)	1.25 (0.13)	1.08 (0.06)[c]
Adjusted[a]	1.75 (0.09)	1.47 (0.02)[b]	1.52 (0.16)	1.51 (0.19)	1.08 (0.05)[b,c]
Air Force					
Unadjusted	1.08 (0.11)	0.96 (0.05)	0.86 (0.07)	0.72 (0.03)	0.57 (0.03)[b,c]
Adjusted[a]	1.08 (0.11)	0.97 (0.04)	0.84 (0.06)	0.75 (0.03)	0.64 (0.03)[b,c]
Total DoD					
Unadjusted	1.48 (0.07)	1.41 (0.05)	1.22 (0.06)	0.96 (0.03)[b]	0.81 (0.04)[b,c]
Adjusted[a]	1.48 (0.07)	1.38 (0.03)	1.29 (0.05)	1.06 (0.03)[b]	0.92 (0.03)[b,c]

Note: Estimates are mean ounces of ethanol (with standard errors in parentheses). Adjusted estimates take into account sociodemographic changes within Services across survey years; estimates have not been adjusted for sociodemographic differences among Services.

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

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1980 to 1992.

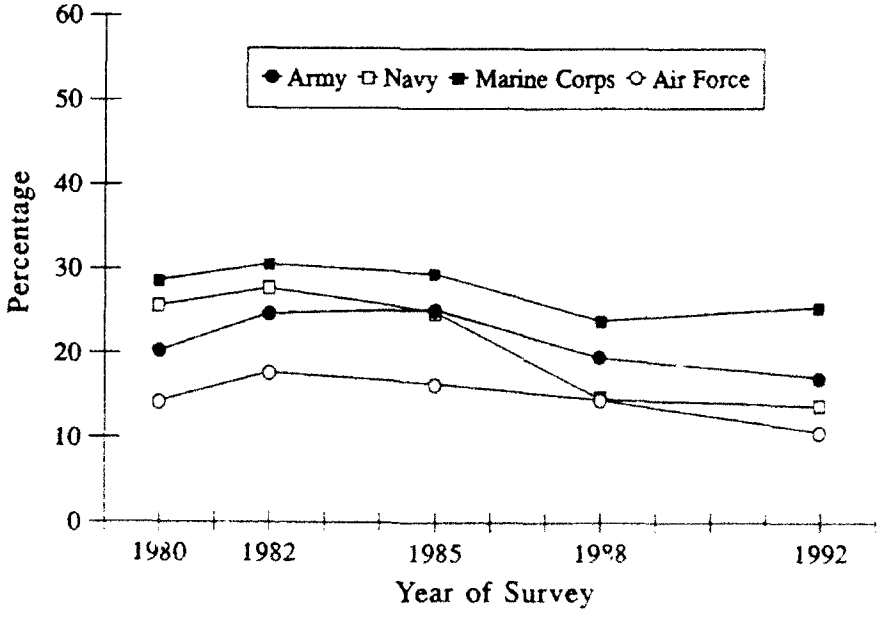
For the total DoD, adjustment of estimates of average daily alcohol (ethanol) consumption across the Worldwide Survey series to take into account demographic changes increased the estimate in 1992 from 0.81 to 0.92 ounces. However, differences between survey years that were statistically significant when comparing unadjusted estimates (i.e., between 1985 and 1988, 1988 and 1992, and 1980 and 1992) remained significant following adjustment. Further, adjustment of estimates to reflect sociodemographic changes did not reveal any statistically significant differences that were not apparent when we compared unadjusted estimates. These findings for the total DoD suggest that decreases in average daily alcohol (ethanol) consumption in the overall

military population across the Worldwide Survey series 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 appreciably affect consumption trends between 1980 and 1992. These findings suggest that the overall decreases for the Services since the Worldwide Survey series began in 1980 were not due primarily to sociodemographic changes. However, it appears that some year-to-year estimates (e.g., between 1988 and 1992 for the Army and Marine Corps) were influenced by sociodemographic changes.

The decreases in the amount of alcohol consumed shown in Figure 4.1 for the total DoD and the Services (see also Tables D.1-D.4) are consistent with changes in drinking levels. Figure 4.2 shows changes in heavy drinking levels from 1980 to 1992 (see also Table 3.1 in Chapter 3 for drinking levels for the total DoD). The percentage of heavy drinkers among total DoD personnel decreased about 5 percentage points between 1980 and 1992, from 20.8% in 1980 to 15.2% in 1992. This decrease over the 12-year period was statistically significant, although the decrease between 1988 and 1992 (from 17.0% to

Figure 4.2 Trends in Heavy Alcohol Use, Past 30 Days, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

15.2%) was not. We also found statistically significant decreases over the 12-year period for the Navy and the Air Force but not for the Army or the Marine Corps.

Between 1988 and 1992, the percentage of heavy drinkers was relatively stable for the individual Services; we found statistically significant decreases only for Air Force personnel. For each of the Services, heavy use was relatively stable between the 1980 and 1985 surveys, and the decreases occurred during the latter part of the period, after 1985. The percentage of heavy drinkers was lowest among Air Force personnel in each of the survey years (but in 1988 was similar to the rate for Navy personnel). By 1992, however, the percentage of heavy drinkers was 10.7% among Air Force personnel, 13.8% among Navy personnel, 17.2% among Army personnel, and 25.5% among Marine Corps personnel.

These decreases in the percentage of heavy drinkers were mirrored by similar increases in the percentage of abstainers. The percentage of abstainers among total DoD personnel increased from 13.5% in 1980 to 20.4% in 1992, a statistically significant increase over the total period and between 1988 and 1992. We found similar increases for all of the Services except the Marine Corps. For Marine Corps personnel, the percentage of abstainers increased significantly over the total period, from 10.4% in 1980 to 15.1% in 1992, but decreased significantly between 1988 (18.0%) and 1992 (15.1%).

To summarize, the overall amount of alcohol consumption and the percentage of heavy drinkers decreased significantly between 1980 and 1992 for the total DoD as well as for the Navy and the Air Force, and were the lowest in 1992 since the survey series began. At the same time, the percentage of abstainers increased. Decreases in the percentages of heavy drinkers occurred mainly since 1985. As noted in Chapter 3, however, overall DoD reductions in heavy drinking between 1980 and 1992 appear to have been largely a reflection of changes in sociodemographic composition of the military rather than a result of programmatic efforts to reduce heavy drinking.

Between 1988 and 1992, the percentage of heavy drinkers decreased significantly only for Air Force personnel. Heavy alcohol use in the Army was at about the same level in 1992 as it was at the start of the Worldwide Survey series in 1980. There have also been no significant declines in heavy drinking among Marine Corps personnel across any of the survey years. These findings indicate that further effort will be needed to reduce heavy drinking in the military.

4.3 Service Comparisons of Alcohol Use

In this section, we provide two sets of estimates both for average daily ethanol use and for the prevalence of heavy alcohol use in 1992 for each of the Services. We begin by presenting unadjusted estimates for each of the Services. These unadjusted estimates are

descriptive only, however, and yield no explanatory information about differences among the Services.

As discussed in Section 2.7, one possible explanation for differences across the Services is differences in their sociodemographic composition. To address this possibility, we also provide adjusted estimates of ethanol use and heavy drinking, using regression-based standardization procedures to control for sociodemographic differences. These constructed estimates resulting from standardization permit comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 1992. Unadjusted and adjusted estimates for both ounces of ethanol and heavy alcohol use are shown in Table 4.2. In addition, comparisons of unadjusted and adjusted estimates of the prevalence of heavy drinking are shown graphically in Figure 4.3.

4.3.1 Unadjusted Estimates

Comparisons of unadjusted estimates of average daily alcohol (ethanol) consumption (Figure 4.1, Table 4.1) and heavy drinking (Figure 4.2) show that alcohol use has generally been lower among Air Force personnel than for personnel from the other Services. In 1992, comparison of unadjusted estimates of average daily ethanol consumption indicated that Air Force personnel on average consumed significantly less alcohol per day than did personnel in the other Services. In addition, Army personnel consumed significantly less alcohol per day on average than did Marine Corps personnel (Table 4.2). There were no significant differences between the Army and Navy or between the Navy 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 1992 were significantly higher among Marine Corps personnel than among personnel in the other Services (see footnote b in Table 4.2 for the Marine Corps, and footnote c for the Army and Navy). In addition, the rate of heavy drinking for the Air Force was significantly lower than for the Army. There was no significant difference in the rates between Navy and Air Force personnel.

These unadjusted estimates of the prevalence of heavy drinking show the relative challenges that the Services face in discouraging heavy drinking among their personnel. The Marine Corps faces the greatest challenge, with an estimate of over one in four Marines (25.5%) being heavy drinkers. The Air Force faces the smallest challenge, with 10.7% of Air Force personnel being heavy drinkers. Rates for the Army (17.2%) and Navy (13.8%) fall between these two extremes. However, these prevalence estimates do not provide any underlying explanations for Service differences with regard to alcohol use. Adjusting for differences in the sociodemographic composition of the Services may explain some of the differences between Services.

Table 4.2 Estimates of Alcohol Use, Unadjusted and Adjusted for Sociodemographic Differences

	Service			
	Army	Navy	Marine Corps	Air Force
Average Daily Ounces of Ethanol				
Unadjusted	0.89 (0.06)[b,c]	0.86 (0.10)[b]	1.08 (0.06)[b]	0.57 (0.03)
Adjusted[a]	0.89 (0.04)[b]	0.81 (0.05)[b]	0.81 (0.06)[b]	0.65 (0.03)
Heavy Drinkers				
Unadjusted	17.2 (1.5)[b,c]	13.8 (1.4)[c]	25.5 (1.2)[b]	10.7 (0.8)
Adjusted[a]	18.0 (1.0)[b,d]	12.8 (0.9)[c]	17.5 (1.1)[b]	12.7 (0.6)

Note: Entries for average daily ounces of ethanol are mean values, and heavy drinkers are percentages. Standard errors are in parentheses. Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps, etc.). Differences that were statistically significant are indicated.

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

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

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

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

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

4.3.2 Adjusted Estimates

Observed differences in daily alcohol (ethanol) use and heavy drinking among the four Services may be partially accounted for by differences in the sociodemographic composition of the Services. In particular, the higher rates of alcohol consumption on average and of heavy drinking in the Marine Corps may have been due in part to the Marine Corps having higher percentages of personnel who are male, younger, less educated, unmarried, and enlisted--groups that have been shown in previous Worldwide Surveys to be more likely to be heavy drinkers. Conversely, the lower levels of alcohol consumption and heavy drinking in the Air Force may have been due in part to its demographiccomposition, with personnel in the Air Force being more likely to be older, better educated, and married. Thus, the Marine Corps could have had a lower level of average alcohol consumption and a lower prevalence of heavy drinking, and the Air Force could have had a higher level of alcohol consumption and a higher rate of heavy drinking, if the Services had had the same sociodemographic composition.

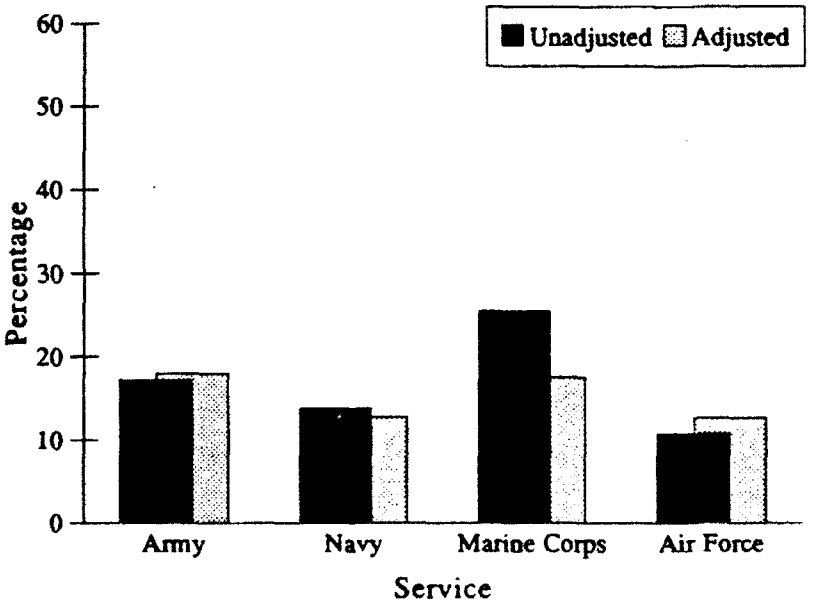
To examine the potential impact of sociodemographic composition of the Services on alcohol use rates, we developed adjusted estimates of average daily alcohol use and heavy alcohol use in 1992. To do so, we standardized the sociodemographic compositions of the Services to the sex, age, education, race/ethnicity, and marital status distributions

for the total DoD. These adjusted estimates following standardization are presented in Table 4.2 for both daily alcohol use and heavy alcohol use, and in Figure 4.3 for heavy alcohol use.

For average daily alcohol (ethanol) consumption, adjusting the estimates for sociodemographic differences had no effect on the Army estimate and relatively little effect on the estimate for the Navy. Standardization raised the Air Force estimate from an average of 0.57 ounces of ethanol per day to an average of 0.65 ounces. Standardization had the greatest effect on the Marine Corps estimate, resulting in a decrease from 1.08 ounces per day on average (unadjusted) to 0.81 ounces (adjusted).

Following standardization, however, the Air Force continued to have a significantly lower level of average alcohol consumption compared to the other Services. In addition, there was no longer a significant difference in average daily alcohol use between the Army and Marine Corps once we adjusted for sociodemographic differences. These results suggest that the lower level of average daily alcohol consumption in the Air Force was not due to differences in sociodemographic composition. However, if the Army and Marine

Figure 4.3 Estimates of Heavy Alcohol Use, Unadjusted and Adjusted for Sociodemographic Differences, by Service



Note: Adjusted estimates have been standardized by sex, age, education, race/ethnicity, and marital status to the total DoD distribution.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Corps were more similar in terms of their sociodemographic composition, personnel in both of these Services would probably consume about the same average amount of alcohol per day.

With regard to heavy alcohol use, standardization to the total DoD demographic composition raised the prevalence estimates slightly for the Army (from 17.2% to 18.0%) and the Air Force (from 10.7% to 12.7%) and lowered the estimate by one percentage point for the Navy (from 13.8% to 12.8%). As was the case with average daily alcohol consumption, standardization had the greatest effect on the estimated prevalence of heavy drinking for the Marine Corps, reducing it by eight percentage points, from 25.5% (unadjusted) to 17.5% (adjusted).

Following standardization, the Army continued to have a significantly higher rate of heavy drinking than did the Air Force, and the Marine Corps continued to have a significantly higher rate of heavy drinking compared to the Navy and the Air Force. However, there was no longer a significant difference in the rates between the Army and the Marine Corps. In addition, adjustment of heavy drinking rates to reflect sociodemographic differences revealed a significant difference between Army and Navy personnel. The unadjusted estimates, on the other hand, had shown a tendency for the Army to have a higher (but not statistically significant) rate of heavy drinking relative to the Navy.

These results indicate that differences in the rates of heavy drinking in 1992 between the Army and the Air Force; the Marine Corps and the Navy; and, the Marine Corps and the Air Force; were not explained by differences in the sociodemographic composition of these Services. That is, the differences were due to other differences among personnel (e.g., attitudes, values) or differences in programs and practices among these Services. However, if the Army and the Marine Corps were more similar in terms of their sociodemographic makeups, they would probably have similar rates of heavy drinking. This finding is particularly important for the Marine Corps, which has consistently shown the highest unadjusted rates of heavy drinking across the Worldwide Survey series (Figure 4.2). It suggests that much of the reason for the higher rates of heavy drinking has been the distinctive sociodemographic makeup of the Marine Corps, which has a higher representation of personnel at greater risk for heavy drinking. If the sociodemographic compositions were the same for all of the Services, then the rate of heavy drinking among Marine Corps personnel would be expected to be about the same as the Army rate. However, as long as the Marine Corps has higher percentages of demographic groups at increased risk for heavy drinking than do the other Services, then the Marine Corps will continue to face the greatest challenge in discouraging heavy drinking among its personnel.

These findings also indicate that the lack of a significant difference when comparing unadjusted rates of heavy drinking in the Army and the Navy is due in part to sociodemographic differences between these two Services. If the Army's sociodemographic composition were more similar to the Navy's, the Army would have a significantly higher rate of heavy drinking.

4.4 Patterns of Alcohol Use

Overall, about 79.6% of total DoD personnel were current drinkers in 1992 and they consumed on average 0.81 ounces of absolute alcohol (ethanol) per day (Tables 3.1 and 4.1). On average, therefore, military personnel consume less than two drinks per day. About 20% were abstainers, almost one-fifth were either infrequent/light or moderate drinkers, 26% were moderate/heavy drinkers, and 15% were heavy drinkers (Table 3.1). As shown in Table 4.3, beer was the beverage of choice of most military personnel, followed by liquor and wine. Some 68.4% of all military personnel drank beer in the past 30 days, compared with 42.8% who drank liquor and 28.8% who drank wine. These percentages are lower than comparable percentages from the 1988 Worldwide Survey, further indicating the downward trend in alcohol use.

Most military personnel did not drink heavily or frequently. For all three beverages, as shown in Table 4.3, those who drank were most likely to drink less than weekly and to drink 1 to 3 drinks per occasion. For the total DoD, 32.4% drank beer less than weekly, 24.0% drank wine that often, and 31.0% drank liquor that often. Some 40.2% drank 1 to 3 beers per occasion, 24.4% drank 1 to 3 glasses of wine, and 30.4% drank 1 to 3 drinks of liquor. Relatively few military personnel drank every day or more than a few drinks per sitting.

4.5 Correlates of Alcohol Use

Past research on military and civilian populations has firmly established that alcohol use patterns differ among certain sociodemographic groups and social conditions. For example, drinking tends to be more common and heavier among younger persons, males, and the less well educated. Drinking patterns are also associated with such factors as perceived stress at work and attitudes and beliefs. Knowledge about these correlates of alcohol use is important in defining high-risk populations for targeting educational and treatment efforts. This section examines the correlates of heavy drinking, based on both descriptive and multivariate analyses.

4.5.1 Descriptive Findings

Findings from the 1992 Worldwide Survey support previous research on patterns of drinking among sociodemographic groups (see Tables D.5 and D.10 in Appendix D). Table D.5 presents drinking levels by sociodemographic characteristics for

Table 4.3 Quantity and Frequency of Alcohol Consumed, Past 30 Days, Total DoD

Beverage/ Quantity	Frequency of Consumption											
	None		Less Than Weekly		1-2 Days/ Week		3-4 Days/ Week		5-7 Days/ Week		Total	
Beer												
None	31.6	(1.0)	*	(*)	*	(*)	*	(*)	*	(*)	31.6	(1.0)
1-3	*	(*)	24.1	(0.6)	10.4	(0.5)	4.0	(0.2)	1.8	(0.2)	40.2	(1.1)
4-7	*	(*)	6.4	(0.4)	7.6	(0.3)	3.9	(0.4)	1.7	(0.2)	19.5	(0.7)
8-11	*	(*)	1.3	(0.3)	2.2	(0.3)	1.2	(0.1)	0.8	(0.1)	5.6	(0.5)
12 or more	*	(*)	0.6	(0.1)	1.0	(0.2)	0.8	(0.2)	0.6	(0.1)	3.1	(0.5)
Total	31.6	(1.0)	32.4	(0.4)	21.2	(0.6)	9.8	(0.6)	5.0	(0.4)	100.0	(--)
Wine												
None	71.2	(1.4)	*	(*)	*	(*)	*	(*)	*	(*)	71.2	(1.4)
1-3	*	(*)	21.1	(1.0)	2.4	(0.3)	0.5	(0.1)	0.3	(0.1)	24.4	(1.3)
4-7	*	(*)	2.5	(0.2)	0.7	(0.1)	0.2	(**)	0.2	(0.1)	3.6	(0.3)
8-11	*	(*)	0.2	(0.1)	0.1	(**)	**	(**)	**	(**)	0.3	(0.1)
12 or more	*	(*)	0.2	(0.1)	0.2	(0.1)	**	(**)	0.1	(**)	0.5	(0.1)
Total	71.2	(1.4)	24.0	(1.0)	3.5	(0.3)	0.7	(0.1)	0.6	(0.1)	100.0	(--)
Liquor												
None	57.2	(0.9)	*	(*)	*	(*)	*	(*)	*	(*)	57.2	(0.9)
1-3	*	(*)	24.8	(0.6)	4.2	(0.2)	0.9	(0.1)	0.4	(0.1)	30.4	(0.6)
4-7	*	(*)	5.1	(0.4)	3.2	(0.4)	1.1	(0.1)	0.3	(0.1)	9.6	(0.6)
8-11	*	(*)	0.9	(0.1)	0.8	(0.1)	0.4	(0.1)	0.1	(**)	2.2	(0.2)
12 or more	*	(*)	0.2	(0.1)	0.2	(**)	0.1	(0.1)	0.1	(**)	0.6	(0.1)
Total	57.2	(0.9)	31.0	(0.6)	8.5	(0.5)	2.5	(0.2)	0.8	(0.1)	100.0	(--)

Note: Data entries are cell percentages. Quantities are the number of beers, glasses of wine, or drinks of liquor usually consumed on a typical day they drink the beverage. Estimates have not been adjusted for sociodemographic differences among Services.

*Not applicable.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

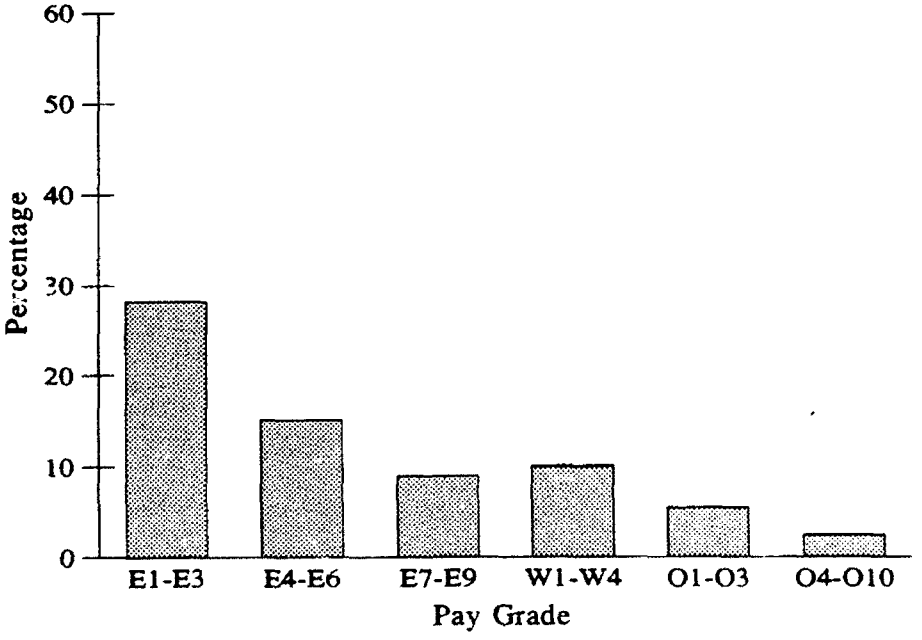
the total DoD, while Table D.10 presents heavy alcohol use by region and pay grade. Comparable tables for drinking levels by sociodemographic characteristics for the individual Services are Tables D.6 through D.9.

Table D.5 shows that the percentage of heavy drinkers was substantially higher among males than females, among those with a high school education or less than among those with more education, among those age 25 or younger compared with older persons, among unmarried persons compared with married persons (with spouse present or absent), and among military personnel in pay grades E1 to E3 than among other pay grades.

Distinctions among regions or among racial/ethnic groups were less apparent. Males were more than four times as likely as females to be heavy drinkers (17.1% compared with 4.4%). We found the highest rates of heavy drinking among those with less than a high school education--some 33.8% were heavy drinkers. However, we also found rates of heavy drinking over 20% for pay grades E1 to E3 (28.2%), younger age groups (24.5% among those aged 20 and younger, 22.5% among those aged 21 to 25), and among those not currently married (23.7%). Almost 30% of females and blacks were abstainers. As shown in Table D.10, more than 30% of E1 to E3 military personnel stationed in the North Pacific (30.7%), Other Pacific (30.2%), and Europe (31.8%) were heavy drinkers.

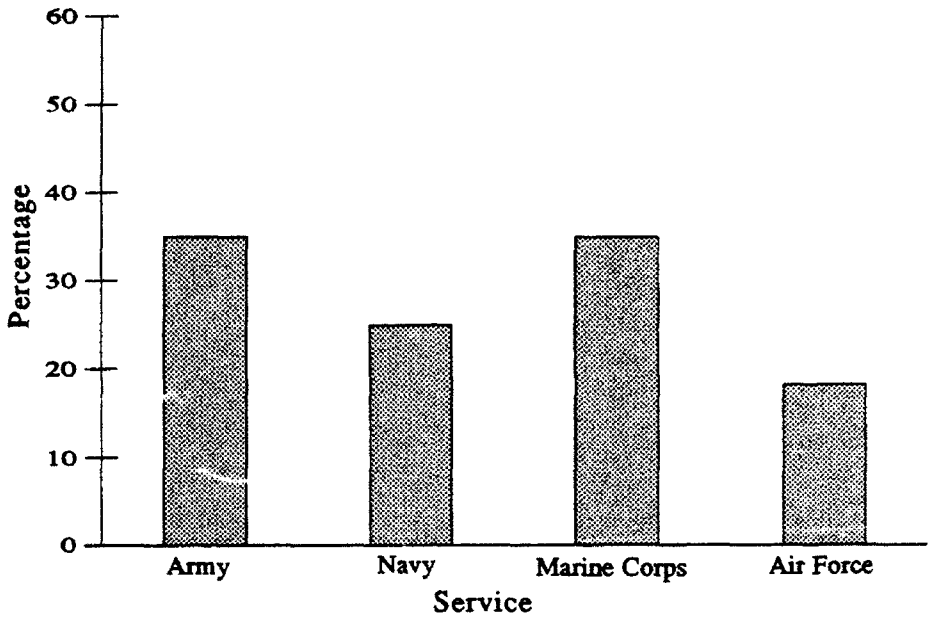
Figure 4.4 illustrates these findings for heavy alcohol use by pay grade (see more detailed presentation in Table D.10). As shown, the percentage of heavy alcohol users was higher among junior enlisted personnel than among officers and substantially higher among pay grades E1 to E3 than among other pay grades. For the total DoD, rates of heavy drinking were 28.2% among E1 to E3 pay grades, 15.2% among E4 to E6s, 9.0% among E7 to E9s, 10.1% among warrant officers, 5.5% among O1 to O3s, and 2.5% among O4 to O10s.

Figure 4.4 Heavy Alcohol Use, by Pay Grade, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 4.5 Heavy Alcohol Use for E1-E3s, by Service



Note: Estimates have not been adjusted for sociodemographic differences among Services.
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 4.5 shows heavy alcohol use among the junior enlisted personnel (E1s to E3s) for each of the Services (see more detailed presentation in Table D.10). As shown, the percentages of heavy drinkers in the Marine Corps (34.9%) and Army (35.0%) were substantially higher than among personnel in the Navy (24.9%) or Air Force (18.2%). However, as noted in Section 4.3, readers should use caution in making these unstandardized comparisons because of the differences in sociodemographic composition of the Services.

4.5.2 Multivariate Findings

The descriptive findings regarding the association between heavy drinking and certain sociodemographic and background factors are informative for identifying potential high-risk groups that are likely to experience alcohol-related problems, but they neither describe the independent relationship of particular demographic characteristics to alcohol use nor consider the significance of the relationships. Findings regarding the relationship of pay grade to drinking level based on descriptive cross-tabulation, for example, may be confounded by age. That is, junior enlisted personnel tend to be younger, a factor also associated with heavy alcohol use. Therefore, some observed differences may not be statistically significant when the effects of other factors are taken into account.

To examine the independent effects of a variety of factors on heavy drinking, we conducted logistic regression analyses. Results from logistic regression are expressed as odds ratios which, in this situation, are ratios of the odds of heavy alcohol use between the two groups being compared, with all other factors held constant. For example, an odds ratio of two indicates that the odds of heavy alcohol use are twice as high in one group compared to a reference group when all other factors are accounted for.

We estimated logistic regression models separately for enlisted males, enlisted females, and officers. For each analysis, the dichotomous outcome measure was heavy drinking versus other drinking levels (excluding abstainers). We excluded abstainers from the analyses, because some important attitudinal and motivational variables that we planned to include in the models (e.g., drinking for the purpose of getting drunk) would not be applicable to abstainers. The independent variables included nine sociodemographic variables: Service, race/ethnicity, education, family status, region, pay grade, occupational classification, age, and participation in Operation Desert Shield/Desert Storm. The psychosocial variables were perceived level of work-related stress, a health practices index, an index of drinking for the purpose of mood alteration, a drinking norms index, and three individual items (the importance of drinking to get drunk, feeling the need for a drink while at work, and the level of disapproval of the respondent's drinking by spouse or date). These variables are noted in Tables F.1 through F.3, and the construction of specific alcohol indexes is described in Appendix E.

For each of the three groups, we estimated two models: a basic model containing only demographic variables, and a full model contai..ng the demographic variables plus the behavioral and psychosocial variables noted above. We present here only the results of the full model (i.e., demographic variables plus behavioral and psychosocial variables). However, detailed results of the two regression analyses are presented in Appendix F, and similarities among the models are discussed here.

Enlisted Males. Five of the demographic variables (Service, race/ethnicity, educational level, family status, and occupational status) and four of the psychosocial variables (health practices index, mood alteration index, drinking to get drunk, and needing a drink at work) were significant predictors of heavy drinking (Table 4.4). Results show that the odds of enlisted males being heavy drinkers were significantly higher, after we adjusted for all other variables in the analysis, for:

- Army and Marine Corps personnel than for Air Force personnel,
- whites than for blacks and personnel from other racial groups (e.g., Asians, Pacific Islanders),
- those with a high school education or less than for those with more,

Table 4.4 Significant Odds Ratios for Predicting Heavy Drinking Among Enlisted Males (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Army vs. Air Force	1.33*	1.05	1.69
Marine Corps vs. Air Force	1.32*	1.08	1.61
Race/Ethnicity			
Black vs. white	0.58***	0.43	0.77
Other vs. white	0.62**	0.44	0.86
Education			
High school or less vs. beyond high school	1.42***	1.17	1.73
Family Status			
Single vs. married, spouse present	1.79***	1.42	2.25
Married, spouse not present vs. married, spouse present	1.84*	1.16	2.93
Occupation			
Functional support vs. direct combat	0.67*	0.47	0.96
Health Practices	0.87**	0.79	0.95
Drinking Mood Alteration Index	1.82***	1.52	2.20
Drink to Get Drunk	1.65***	1.50	1.83
Times at Work I Could Use a Drink	1.21***	1.12	1.30

Note: Abstainers were excluded from the analysis. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*p < .05.
**p < .01.
***p < .001.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

- single persons and married persons with spouse absent than for married persons with spouse present,
- persons in direct combat than for those in functional support,
- persons engaging in fewer health practices,
- persons who tended to drink to alter their mood,
- persons who drink to get drunk, and
- persons who thought they could use a drink at work.

In particular, the demographic variable that was most predictive of heavy drinking among enlisted males was family status. Single enlisted men were 79% more likely to be heavy drinkers than were married personnel who were accompanied by their spouses, and enlisted men who were married but not accompanied were 84% more likely to be heavy drinkers than were those who were accompanied.

However, it appeared that the behavioral and psychosocial variables included in the analysis were much more important predictors of heavy drinking among enlisted men than were the demographic variables. In particular, it appears that the probability of heavy drinking increased substantially for enlisted men who drank to alter their mood state or who drank to get drunk. Each additional unit increase on the drinking mood alteration index (i.e., increasing importance of drinking to alter one's mood) increased the odds of heavy drinking by 82%. An increase of one unit for the "drinking to get drunk" measure (e.g., from "slightly important" to "fairly important") increased the odds of heavy drinking by 65%. These results suggest that a substantial number of enlisted men who were heavy drinkers might have been self-medicating, which, in turn may underscore the need for increased availability of treatment programs.

The estimated parameters associated with the demographic variables for the full model (i.e., including demographic, behavioral, and psychosocial variables) were similar in size and pattern to those for the reduced demographic model. The only major difference was that pay grade and age were not significant for the full model but were for the demographic model. The inclusion of psychosocial variables in the regression model reduced the effects of these demographic variables, suggesting considerable overlap between these demographic and psychosocial variables. For example, many younger enlisted men and junior enlisted men may also have drunk for the purpose of getting drunk.

Enlisted Females. For enlisted females, four demographic variables (race/ethnicity, family status, region, and occupational classification) and three psychosocial variables (mood alteration index, drinking to get drunk, and needing a drink at work) were significantly related to the probability of heavy drinking (Table 4.5).

Table 4.5 Significant Odds Ratios for Predicting Heavy Drinking Among Enlisted Females (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Race/Ethnicity			
Black vs. white	0.26*	0.09	0.79
Family Status			
Single vs. married, spouse present	3.24*	1.37	7.67
Region			
North Pacific vs. Europe	2.14*	1.11	4.11
Occupation			
Craftsman vs. service & supply	20.76***	4.35	98.97
Drinking Mood Alteration Index	4.27*	1.07	17.09
Drink to Get Drunk	1.94*	1.11	3.37
Times at Work I Could Use a Drink	1.41*	1.07	1.84

Note: Abstainers were excluded from the analysis. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*p < .05.
**p < .01.
***p < .001.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Results show that the probability of being a heavy drinker was significantly higher among enlisted females, after we adjusted for other variables in the analysis, for:

- whites than blacks,
- single persons than married persons (spouse present or absent),
- those who were stationed in the North Pacific than those stationed in Europe,
- enlisted females in the craftsmen occupational group compared to enlisted females in a number of other occupations,
- those who drank to alter their mood,

- those who drank to get drunk, and
- those who needed a drink at work.

The odds of heavy drinking among blacks was only 26% of that for whites. Married enlisted women whose spouses were absent had the lowest probability of heavy drinking, but their odds of heavy drinking were not significantly different from the odds for married enlisted women who were accompanied by their spouses. However, single enlisted women were 3.24 times more likely to be heavy drinkers than were married enlisted women whose spouse was present.

Enlisted women stationed in the North Pacific had odds of heavy drinking that were over four times that of the corresponding odds of those stationed in Europe. With respect to occupational classification, the odds of heavy drinking were lowest for electronic equipment technicians and highest for craftsmen. For example, the odds of heavy drinking among craftsmen were 20.76 times higher than the corresponding odds for service and supply handlers. The craftsman odds of heavy drinking were also significantly higher than the odds for many other occupations.

A unit increase on the mood alteration index increased the odds of heavy drinking by a factor of 2.14 for enlisted women. A unit increase on the "drink to get drunk" item increased the odds of heavy drinking by 94% and a unit increase on the "needing a drink at work" item increased the odds by 41%. The estimated regression parameters for the basic demographic model were similar to those of the corresponding estimated parameters of the full model.

There were differences between the enlisted male and enlisted female models. Service, education, and health practices were highly significant predictors of heavy drinking for males but were not significant predictors for females. On the other hand, region was a significant predictor of heavy drinking for females but not for males. Important predictors of heavy drinking for both enlisted males and females were drinking motivational variables. Like enlisted males, a number of enlisted females who were heavy drinkers may have been self-medicating.

Officers. For officers, seven demographic variables (Service, race/ethnicity, education level, family status, region, pay grade, and occupation) and two psychosocial variables (mood alteration and drinking to get drunk) were significantly related to the probability of heavy drinking (Table 4.6). Results show that the probability of being a heavy drinker was significantly higher, after we adjusted for other variables in the analysis, for:

Table 4.6 Significant Odds Ratios for Predicting Heavy Drinking Among Officers (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Army vs. Air Force	2.46*	1.13	5.37
Race/Ethnicity			
Black vs. white	0.31*	0.11	0.83
Education			
High school or less vs. beyond high school	2.55*	1.06	6.09
Family Status			
Single vs. married, spouse present	2.06*	1.20	3.52
Region			
North Pacific vs. Europe	3.93%	1.23	12.53
Pay Grade			
W1-W4 vs. O4-O10	3.30**	1.61	6.74
Occupation			
Engineering/maintenance vs. tactical operations	2.20*	1.07	4.51
Scientist/professional vs. tactical operations	0.06*	0.00	0.92
Nonoccupational vs. tactical operations	2.20*	1.03	4.71
Drinking Mood Alteration Index	3.98***	2.39	6.63
Drink to Get Drunk	2.96***	1.86	4.71

Note: Abstainers were excluded from the model. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*p < .05.
**p < .01.
***p < .001.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

- those in the Army than those in the Air Force;
- whites, Hispanics, and others than blacks;
- those with post-secondary education than high school graduates;
- single persons than those married with spouse present;
- those stationed in the North Pacific than those in Europe;
- warrant officers than senior officers;
- engineering and non-occupational than tactical operations;
- tactical operations officers than scientists;
- those who drank to get drunk; and
- those who tended to drink to alter their mood state.

The odds of heavy drinking for Army officers were 2.46 times higher than for Air Force officers. The odds of heavy drinking for black officers were much lower compared to the other three racial/ethnic groups. For example, the odds of heavy drinking among blacks were only 31% of the corresponding odds for whites. In addition, the odds of heavy drinking among single officers were 2.06 times higher than the corresponding odds for married officers with spouse present. The odds of heavy drinking for those with a high school education or less were 2.55 times higher than for those who continued their education beyond high school.

The odds of heavy drinking among officers stationed in the Americas, Europe, and the Other Pacific were essentially the same. However, the odds of heavy drinking among officers stationed in the North Pacific were 3.93 times higher than the corresponding odds for officers stationed in Europe.

Although junior officers had higher odds of heavy alcohol use than senior officers, the difference was not significant at the .05 level. However, the odds of heavy drinking for warrant officers were 3.30 times higher than the corresponding odds for senior officers.

Engineering or maintenance officers and those classified as non-occupational had a higher probability of heavy alcohol use than tactical operation officers. Scientific or professional officers had a lower probability of heavy alcohol use than tactical operations officers.

Drinking to alter mood and drinking to get drunk were highly related to the probability of heavy drinking. A unit increase on the drinking mood alteration index increased the odds of heavy drinking by a factor of almost 4 (3.98). A unit increase in the

The full model differed in some respects from the demographic model. Race/ethnicity was a significant predictor of heavy drinking in the full model, but was not significant in the demographic model. On the other hand, sex was significant in the demographic model but was not significant in the full model. The odds of heavy drinking for male officers were 3.20 times higher than the corresponding odds of heavy drinking for female officers when we included only demographic variables. Again, these results suggest considerable overlap between demographic, behavioral, and psychosocial variables.

The factors predicting heavy drinking among enlisted males and officers appeared to be more similar than those for enlisted females. This could have been partially due to the fact that most of the officers were male. However, family status, race/ethnicity, occupational classification, drinking to alter mood, and drinking to get drunk were predictive of heavy drinking for all three groups. These findings suggest that special efforts targeted at single people in certain occupations may be beneficial. Further, the finding that drinking to alter one's mood or drinking for the purpose of getting drunk seemed to be the most important predictors of heavy drinking for all three groups suggests that some heavy drinkers may have been drinking to self-medicate and may need intervention to help them find alternative ways to deal with their feelings.

4.6 Military Job and Alcohol Use

Drinking can impair combat performance and overall productivity of military personnel. The negative effects of drinking on work performance--lowered productivity, missing work or coming to work late, an inability to concentrate on tasks--are among the reasons the Department of Defense is concerned with drinking among military personnel. At the same time, heavy drinking among military personnel may be more likely among some occupational classifications, as indicated in the preceding section, and the military job itself may foster heavy drinking in response to perceived high levels of stress. We examine the negative effects of alcohol use on work performance in more detail in Chapter 7. Here we examine heavy alcohol use among occupational classifications, alcohol use on workdays, and the relationship between perceived stress at work and drinking level.

As shown in Table 4.7, rates of heavy alcohol use were higher among enlisted personnel (17.2% were heavy drinkers) than among officers (4.7%), and substantially higher among some occupations. The percentage of heavy drinkers was highest among enlisted personnel in the total DoD in direct combat occupations (28.6%), followed by enlisted craftsmen (20.4%). We found rates of heavy drinking of 30% or higher among Marine Corps personnel in direct combat (36.3%) and Army personnel in direct combat (30.8%). Among enlisted personnel, other occupations with relatively high percentages of heavy drinkers were electrical/mechanical repair and communications and intelligence.

Table 4.7 Heavy Alcohol Use, by Occupation

Pay Grade/Occupation	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Enlisted										
Direct combat	30.8	(2.7)	17.4	(4.7)	36.3	(1.9)	18.6	(3.0)	28.6	(1.7)
Electronic equipment repair	18.1	(4.0)	14.1	(2.0)	26.6	(5.4)	13.4	(3.4)	15.1	(1.6)
Communications & intelligence	19.5	(3.0)	14.0	(3.4)	28.2	(3.8)	9.5	(2.9)	16.9	(2.0)
Health care	18.5	(3.5)	18.0	(2.0)	*	(*)	3.0	(1.3)	14.4	(1.8)
Other technical	20.3	(5.0)	20.7	(6.2)	12.4	(5.0)	9.7	(2.1)	14.9	(2.2)
Support & administration	12.4	(2.2)	7.8	(2.4)	14.6	(4.0)	8.5	(1.4)	10.3	(1.1)
Electrical/mechanical repair	21.1	(2.7)	15.7	(3.0)	25.4	(2.1)	17.7	(2.0)	18.2	(1.6)
Craftsman	+	(+)	+	(+)	+	(+)	15.4	(3.3)	20.4	(5.0)
Service and supply	14.0	(2.3)	5.6	(3.2)	27.4	(4.5)	17.1	(2.3)	14.3	(1.9)
Non-occupational	19.8	(4.2)	19.4	(2.1)	30.0	(6.3)	14.2	(3.5)	18.8	(1.7)
Total enlisted	19.8	(1.5)	14.9	(1.6)	27.6	(1.0)	12.7	(0.7)	17.2	(0.8)
Officer										
General officer or executive	+	(+)	4.1	(2.1)	+	(+)	2.2	(1.7)	5.7	(2.0)
Tactical operations	4.2	(1.6)	+	(+)	4.9	(2.7)	3.9	(0.9)	4.7	(1.2)
Intelligence	+	(+)	**	(**)	2.1	(1.3)	0.7	(0.7)	2.2	(1.5)
Engineering/maintenance	8.0	(3.6)	9.1	(4.0)	+	(+)	3.6	(1.9)	6.8	(1.8)
Scientist/professional	0.6	(0.6)	+	(+)	**	(**)	0.8	(0.6)	0.7	(0.4)
Health care	3.0	(1.4)	1.9	(1.1)	*	(*)	1.1	(1.0)	2.1	(0.7)
Administrator	6.6	(1.9)	3.7	(2.4)	+	(+)	+	(+)	4.4	(1.1)
Supply/procurement	13.6	(5.8)	+	(+)	+	(+)	**	(**)	7.7	(2.6)
Non-occupational	+	(+)	+	(+)	+	(+)	+	(+)	9.6	(3.6)
Total officers	5.3	(0.8)	5.7	(1.3)	8.1	(1.3)	2.7	(0.9)	4.7	(0.5)

Note: Table values are percentages (with standard errors in parentheses). Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations). Estimates have not been adjusted for sociodemographic differences among Services.

*There are no health care personnel in the Marine Corps.
**Estimate rounds to zero.
+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Marine Corps personnel in direct combat (36.3%) and Army personnel in direct combat (30.8%). Among enlisted personnel, other occupations with relatively high percentages of heavy drinkers were electrical/mechanical repair and communications and intelligence. As indicated in the preceding section, however, enlisted males in direct combat occupations were more likely to be heavy drinkers than those in functional support positions, and enlisted females in craftsmen positions were more likely than service and

supply personnel to be heavy drinkers, after we controlled for the effects of other variables.

Among officers in the total DoD, rates of heavy drinking were highest among supply/procurement personnel (7.7%) and engineering/maintenance personnel (6.8%). Among the Services, estimates for some occupations were not reliable, particularly for officers in the Marines. However, rates of heavy drinking were relatively high among supply/procurement personnel in the Army (13.6%) and engineering/maintenance officers in the Navy (9.1%).

Relatively few military personnel reported that they drank alcohol within 2 hours of going to work (2.9%), during lunch break (4.0%), or during work or work break (1.4%) within the past 30 days (these findings are shown in Table 4.8 for the total DoD and for enlisted personnel and officers). However, 6.2% of military personnel had engaged in one or more of these behaviors. Although these percentages are relatively small, they indicate that some military personnel have been impaired at work. Officers were less likely than enlisted personnel to drink within 2 hours of going to work or during work or work break,

Table 4.8 Alcohol Use on Workdays, Past 30 Days

	Service				
Grade/Drinking Occasions	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Enlisted					
Within 2 hours of going to work	3.5 (0.6)	4.9 (2.0)	4.0 (0.6)	1.3 (0.2)	3.4 (0.7)
During lunch break	3.6 (0.6)	5.2 (0.9)	4.8 (0.5)	3.1 (0.4)	4.1 (0.4)
During work or work break	1.9 (0.6)	1.5 (0.4)	1.5 (0.4)	1.3 (0.2)	1.6 (0.2)
Total*	5.8 (0.9)	8.6 (2.3)	7.3 (1.3)	4.6 (0.6)	6.5 (0.8)
Officers					
Within 2 hours of going to work	0.6 (0.3)	0.6 (0.4)	** (**)	0.6 (0.3)	0.5 (0.2)
During lunch break	1.5 (0.4)	6.3 (1.8)	2.0 (1.1)	4.5 (1.4)	3.7 (0.7)
During work or work break	0.1 (0.1)	** (**)	** (**)	1.9 (0.5)	0.7 (0.2)
Total*	2.0 (0.4)	6.6 (1.9)	2.0 (1.1)	6.0 (1.7)	4.4 (0.8)
Total					
Within 2 hours of going to work	3.0 (0.6)	4.4 (1.8)	3.6 (0.6)	1.1 (0.2)	2.9 (0.6)
During lunch break	3.2 (0.5)	5.4 (0.8)	4.5 (0.4)	3.4 (0.5)	4.0 (0.3)
During work or work break	1.6 (0.5)	1.3 (0.4)	1.3 (0.4)	1.4 (0.2)	1.4 (0.2)
Total*	5.1 (0.8)	8.4 (2.0)	6.7 (1.1)	4.9 (0.6)	6.2 (0.7)

Note: Entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.

*Totals are percentages who used alcohol on any of the above occasions.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

but officers and enlisted personnel were about equally likely to drink during lunch break. Overall, about 6.5% of enlisted personnel and 4.4% of officers drank alcohol just before or during work hours in the past 30 days. Differences among the Services were not substantial, although somewhat higher percentages of Navy officers drank during lunch. Compared with related findings from the 1988 Worldwide Survey, these findings show a decrease in the percentage of military personnel who drank right before or during work hours (from 10.0% in 1988 to 6.2% in 1992).

Findings from the 1988 Worldwide Survey suggested a positive relationship between reported stress at work and heavy alcohol use (Bray et al., 1988). Assuming that some personnel drank to help them relax, those perceiving a great deal of stress at work might be expected to be heavier drinkers than those perceiving little stress. The percentage distributions of perceived levels of work-related stress for total DoD, enlisted personnel, and officers are presented in Table 4.9. The relationship between reported level of stress at work and drinking level for total DoD personnel, enlisted personnel, and officers is presented in Table 4.10. As shown in Table 4.9, virtually all military personnel reported some stress at work, and more than 50% reported a great deal of stress or a fairly large amount of stress. Levels of stress reported by enlisted personnel and officers were similar.

As shown in Table 4.10, drinking levels were closely associated with levels of perceived stress at work for total DoD personnel. The percentage of moderate/heavy or heavy drinkers was substantially higher among those reporting a great deal of stress than among those reporting little or no stress. Almost half of those perceiving a great deal of stress at work were moderate/heavy or heavy drinkers compared with about one-third of those perceiving little or no stress. There were correspondingly more abstainers among those reporting little or no stress compared with those reporting a great deal of stress. This pattern was particularly noticeable for enlisted personnel.

However, perceived work-related stress was not a significant predictor of heavy drinking among enlisted males, enlisted females, or officers, after we controlled for the effects of other psychosocial variables as well as for the effects of demographic and behavioral variables. These results suggest that perceived work-related stress may be highly related to other variables that are strong predictors of heavy drinking. For many personnel, for example, drinking to cope with stress may be synonymous with drinking to alter their mood state, a highly significant predictor of heavy drinking in all three regression models (i.e., for enlisted males, enlisted females, and officers). In addition, many personnel who drink to deal with stress may also be likely to drink for the purpose of getting drunk, another highly significant predictor of heavy drinking.

Taken together, the findings in this section indicate that although alcohol use can impair productivity of the military work force, relatively few military personnel drank

Table 4.9 Reported Stress Experienced at Work, Past 12 Months, by Grade Level, Total DoD

	Grade Level		
Stress Level	**Enlisted**	**Officer**	**Total**
Great deal	26.1 (1.2)	25.5 (1.5)	26.0 (1.1)
Fairly large amount	25.9 (0.7)	31.4 (1.4)	26.8 (0.6)
Some	28.6 (1.0)	30.2 (1.4)	28.9 (0.9)
A little	13.9 (0.6)	11.4 (1.3)	13.5 (0.5)
None	5.5 (0.3)	1.6 (0.2)	4.9 (0.3)

Note: Entries are column percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 4.10 Reported Stress Experienced at Work, Past 12 Months, by Drinking Level, Total DoD

	Drinking Level		
Grade/Stress Level	**Abstainer**	**Infrequent/Light and Moderate**	**Moderate/Heavy and Heavy**
Enlisted			
Great deal	19.7 (1.5)	33.6 (1.1)	46.7 (1.2)
Fairly large amount	18.2 (0.8)	38.3 (1.1)	43.5 (1.3)
Some	19.8 (1.0)	37.9 (1.0)	42.2 (1.2)
A little	26.4 (1.9)	37.7 (1.5)	35.9 (2.1)
None	29.5 (2.9)	39.4 (2.7)	31.0 (3.0)
Officer			
Great deal	19.3 (1.8)	45.1 (2.3)	35.6 (2.5)
Fairly large amount	15.1 (1.6)	45.3 (1.8)	39.7 (2.3)
Some	16.2 (1.7)	46.4 (2.1)	37.4 (2.0)
A little	25.1 (2.9)	46.9 (2.4)	28.0 (3.3)
None	+ (+)	25.4 (6.7)	+ (+)
Total			
Great deal	19.6 (1.4)	35.4 (1.0)	45.0 (1.2)
Fairly large amount	17.6 (0.7)	39.6 (1.0)	42.8 (1.2)
Some	19.2 (1.0)	39.4 (0.9)	41.4 (1.1)
A little	26.2 (1.7)	38.9 (1.4)	34.8 (1.9)
None	30.2 (2.9)	38.7 (2.6)	31.0 (2.9)

Note: Entries are row percentages (with standard errors in parentheses).

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

immediately before or during work hours. Further, the decrease in this behavior from 1988 to 1992 suggests an improved climate that is nonsupportive of drinking during working hours. This shift parallels that in the civilian world of a move away from the "3-martini" business lunch. However, drinking may be related to perceptions of stress at work, although perceived work-related stress appears to have been associated with other factors that were strong predictors of heavy drinking. In addition, certain military occupations, notably direct combat, may foster higher levels of drinking.

4.7 Military and Civilian Comparisons

As noted at the beginning of this chapter, comparisons of alcohol use among military personnel and civilians may be misleading because of the differences in sociodemographic composition between the two populations. Military personnel in 1992 were still predominantly young and male, as compared to the civilian population, factors both associated with higher drinking levels. To compare rates of drinking and heavy drinking among military personnel and civilians, we standardized civilian data to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status (see Appendix F). Standardized comparisons based on 1985 Worldwide Survey data and 1985 NHSDA data suggested that military personnel were much more likely than civilians to drink and to drink heavily. Because of the relative stability of alcohol use among both military and civilian populations, we would expect differences between the two populations to continue.

Results of standardized comparisons of alcohol use among military personnel and civilians are presented in Tables 4.11 and 4.12. Table 4.11 presents standardized comparisons for drinking levels, while Table 4.12 presents standardized comparisons for heavy drinking. Comparisons of standardized rates of the prevalence of heavy drinking presented in Table 4.12 are also illustrated in Figure 4.6. Data for civilians are standardized estimates from the 1991 NHSDA, while data for military personnel are U.S.-based population estimates (including personnel stationed in Alaska and Hawaii) from the 1992 Worldwide Survey. As shown in Table 4.11, most comparisons of drinking levels among military personnel and civilians were significant for the total DoD and for males, while fewer military/civilian comparisons were significant for females. Thus, for the total DoD and males, military personnel were significantly more likely than comparable civilians to be infrequent/light to moderate/heavy drinkers or heavy drinkers and were less likely to be abstainers. The major exception was Air Force personnel, among whom rates of heavy drinking were similar to those for civilians. Military women were significantly less likely than civilians to be abstainers and significantly more likely to be infrequent/light to moderate/heavy drinkers.

Findings for military/civilian comparisons of heavy drinking are presented in Table 4.12 and Figure 4.6, for males and females separately, and by age group (18 to 25,

Table 4.11 Standardized Comparisons of Drinking Levels Among Military Personnel and Civilians for Persons Ages 18-55

Sex/Drinking Level	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,814	N=10,224	N=3,107	N=2,321	N=1,636	N=3,160
Abstainer	32.0 (1.0)	19.7 (0.7)[a]	21.1 (1.6)[a]	19.0 (1.7)[a]	15.0 (0.8)[a]	21.0 (0.9)[a]
Infrequent/Light-Moderate/Heavy	57.5 (1.0)	64.1 (0.9)[a]	60.2 (1.8)[a]	66.4 (1.7)[a]	59.2 (1.9)	68.1 (1.4)[a]
Heavy	10.5 (0.7)	16.2 (0.8)[a]	18.7 (1.7)[a]	14.5 (1.0)[a]	25.9 (1.6)[a]	10.9 (1.1)
Females	N=11,981	N=1,264	N=316	N=390	N=80	N=478
Abstainer	46.6 (0.9)	32.0 (1.7)[a]	42.3 (3.0)	28.1 (2.7)[a]	16.1 (5.7)[a]	31.4 (3.0)[a]
Infrequent/Light-Moderate/Heavy	49.8 (0.9)	63.7 (2.0)[a]	54.3 (3.1)	67.5 (3.1)[a]	+ (+)	63.9 (3.4)[a]
Heavy	3.5 (0.3)	4.3 (0.8)	3.4 (1.5)	4.4 (1.3)	+ (+)	4.7 (1.3)
Total	N=20,795	N=11,488	N=3,423	N=2,711	N=1,716	N=3,638
Abstainer	34.2 (0.9)	21.5 (0.8)[a]	23.7 (1.7)[a]	20.9 (1.9)[a]	15.0 (0.7)[a]	22.5 (1.1)[a]
Infrequent/Light-Moderate/Heavy	56.4 (0.9)	64.0 (0.8)[a]	59.5 (1.7)	66.7 (1.4)[a]	59.8 (1.5)	67.4 (1.6)[a]
Heavy	9.5 (0.6)	14.5 (0.8)[a]	16.8 (1.8)[a]	12.4 (1.0)[a]	25.2 (1.5)[a]	10.0 (1.0)

Note: Table entries are percentages (with standard errors in parentheses). Civilian data have been standardized to the U.S.-based DoD data by sex, 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). N's show 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 at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 4.12 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians for Persons Ages 18-55

Sex/Age Group	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,814	N=10,224	N=3,107	N=2,321	N=1,636	N=3,160
18-25	13.8 (1.3)	25.9 (1.6)*	30.3 (2.7)*	22.1 (2.4)*	34.8 (3.2)*	16.9 (2.2)
26-55	8.5 (0.7)	10.5 (0.6)*	12.0 (1.5)*	9.9 (0.7)	14.3 (2.1)*	8.5 (1.3)
All ages	10.5 (0.7)	16.2 (0.8)*	18.7 (1.7)*	14.5 (1.0)*	25.9 (1.6)*	10.9 (1.1)
Females	N=11,981	N=1,264	N=316	N=390	N=80	N=478
18-25	5.2 (0.5)	5.1 (1.8)	3.9 (2.3)	3.6 (2.2)	+ (+)	9.8 (2.2)*
26-55	2.0 (0.2)	3.5 (1.0)	3.1 (1.9)	5.4 (1.9)	** (**)	1.6 (0.9)
All ages	3.5 (0.3)	4.3 (0.8)	3.4 (1.5)	4.4 (1.3)	+ (+)	4.7 (1.3)
Total	N=20,795	N=11,488	N=3,423	N=2,711	N=1,716	N=3,638
18-25	12.2 (1.1)	22.1 (1.8)*	26.8 (2.9)*	16.9 (2.6)	33.9 (3.0)*	15.6 (1.8)
26-55	7.7 (0.6)	9.6 (0.6)*	11.0 (1.4)*	9.2 (0.7)	13.8 (2.0)*	7.6 (1.1)
All ages	9.5 (0.6)	14.5 (0.8)*	16.8 (1.8)*	12.4 (1.0)*	25.2 (1.5)*	10.0 (1.0)

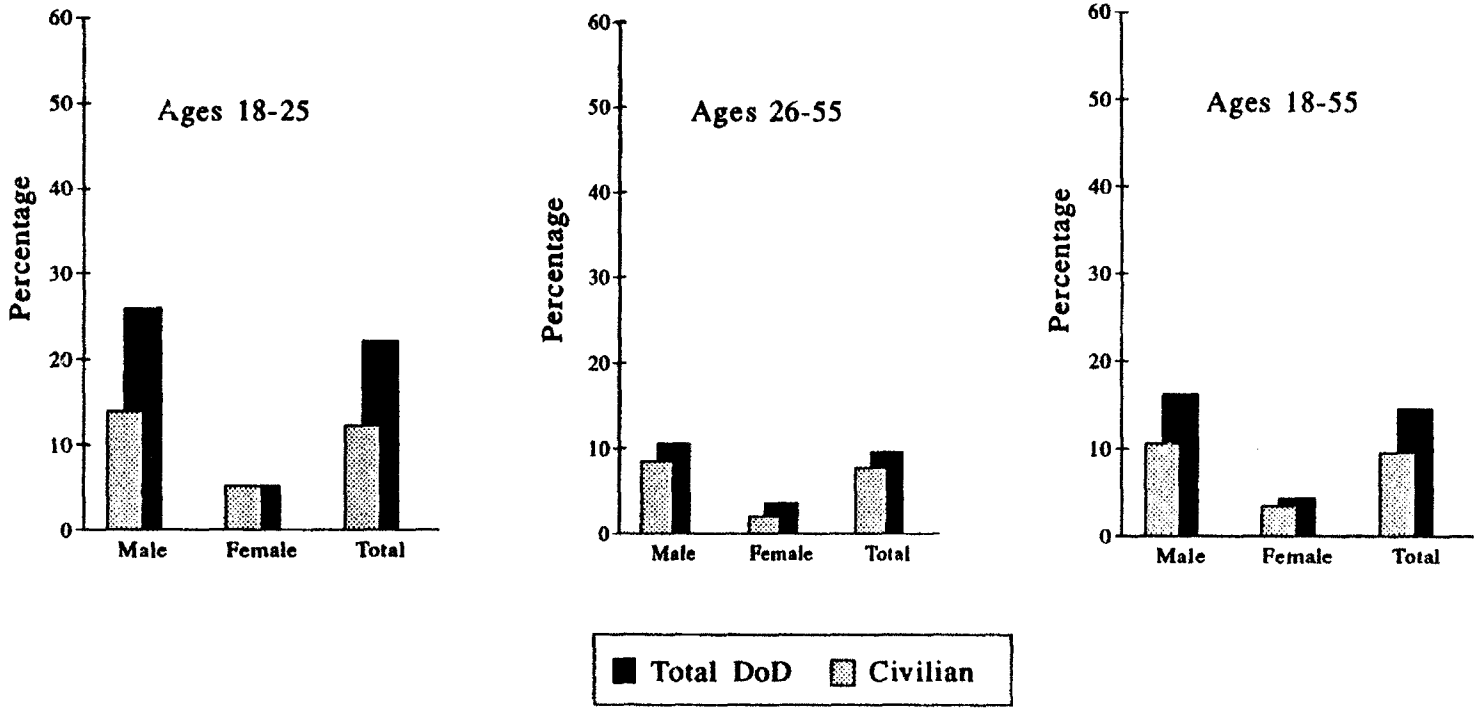
Note: Table entries are percentages (with standard errors in parentheses). Civilian data have been standardized to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.
+Unreliable estimate.

*Significantly different from civilian at the .05 level.

Civilian data source: 1991 National Household Survey on Drug Abuse.
Military data source: 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel.

Figure 4.6 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

26 to 55, and all ages). These findings show that the percentage of heavy drinkers generally was significantly higher among military personnel than among civilians for the U.S.-based total DoD and for males. The one exception is that none of the differences between Air Force personnel and civilians were statistically significant; rates of heavy drinking among Air Force personnel were highly similar to those for civilians when we controlled for differences in sociodemographic composition. Males showed the same pattern of results as total DoD with higher rates of drinking in the military than among civilians. Females, however, showed very similar rates to civilians. One exception for females occurred in the Air Force. Younger female Air Force personnel (ages 18 to 25) were significantly more likely (9.8%) than young female civilians (5.2%) to be heavy drinkers.

Differences in military and civilian heavy drinking rates were largest for men aged 18 to 25. The military rate was roughly twice as high as the civilian rate (25.9% vs. 13.8%). For the Services, the largest discrepancy for this age group was for Marine Corps men (34.8% vs. 13.8%) and for Army men (30.3% vs. 13.8%).

The higher rates of drinking and heavy drinking among military personnel remained after we controlled for differences in the sociodemographic composition of military and civilian populations. Although military personnel were more likely to be young and male, rates of drinking and heavy drinking were significantly higher than among civilians even when we took such differences into account.

4.8 Summary

Surveys of civilian and military populations and information about alcohol sales have indicated that most people drink at least some, but they drank less on average in the early 1990s than previously, and the percentage of abstainers has increased. However, trends in alcohol use have been relatively stable compared with changes in drug use and tobacco use over the same period of time.

4.8.1 Trends in Alcohol Use

The findings from the 1992 Worldwide Survey largely support these findings from civilian and military studies. By 1992, the overall amount of alcohol consumed and the proportion of military personnel who were heavy drinkers were the lowest since the survey series began.

- The average daily amount of ethanol consumed by total DoD personnel had decreased from 1.48 ounces in 1980 to 0.81 ounces in 1992, a decrease of 45% in 12 years (Table 4.1 and Figure 4.1).
- Alcohol consumption (as measured by average ounces of ethanol) has been consistently lower among Air Force personnel than among the

other Services, in part because of the distinctive sociodemographic composition of the Air Force (Table 4.1 and Figure 4.1). However, alcohol consumption has decreased substantially among members of the other Services as well.

- In 1992, 79.6% of military personnel were current drinkers with about two-thirds being moderate to heavy drinkers and 15.2% being heavy drinkers (Table 3.1).

- The percentage of heavy drinkers among total DoD personnel decreased significantly between 1980 and 1992 from 20.8% to 15.2% (Table 3.1). The decrease between 1988 and 1992 (from 17.0% to 15.2%) was not statistically significant.

- The prevalence of heavy drinking decreased significantly between 1980 and 1992 for the Navy and Air Force (Tables D.1 through D.4). Heavy drinking in the Army was at about the same level in 1992 as at the start of the Worldwide Series in 1980, and heavy drinking among Marine Corps personnel has not shown any significant declines across the survey years.

- The percentage of abstainers among total DoD personnel increased significantly, from 13.5% in 1980 to 20.4% in 1992; the increase between 1988 and 1992 was also statistically significant (Table 3.1). The percentage of abstainers also increased significantly between 1980 and 1992 for each of the four Services and between 1988 and 1992 for Army and Air Force personnel (Tables D.1-D.4). For the Marines, however, the percentage of abstainers decreased significantly between 1988 and 1992.

4.8.2 Service Comparisons of Alcohol Use

Observed differences in ethanol use and heavy drinking among the four Services may be partially accounted for by differences in the sociodemographic composition of the Services (Table 4.2 and Figure 4.3).

- Comparisons of estimates that had not been adjusted for sociodemographic differences between the Services showed that ethanol use in 1992 was significantly lower among Air Force personnel than among members of the other Services. Ethanol use was also significantly lower among Army personnel than among Marine Corps personnel. Rates of heavy drinking were significantly lower among Air Force personnel than among Army and Marine Corps personnel and significantly greater among Marine Corps personnel than among other Services. The 25.5% rate of heavy drinking among Marines presents the greatest challenge for the military.

- Adjusting rates for demographic differences by standardizing to the 1992 total DoD demographic composition raised the rates of heavy drinking for the Army and the Air Force, lowered the rate slightly for the Navy, and lowered the rate most notably for the Marine Corps, from 25.5% (unadjusted) to 17.5% (adjusted).

- For adjusted rates, the Army continued to have a significantly higher rate of heavy drinking than the Air Force, and the Marine Corps continued to have a significantly higher rate of heavy drinking than the Navy and the Air Force. However, there was no longer a significant difference in the rates between the Army and the Marine Corps.

- In addition, adjustment of heavy drinking rates revealed a significant difference between Army and Navy personnel. The unadjusted estimate, on the other hand, had shown a nonsignificant tendency for the Army to have a higher rate than the Navy.

- Overall, comparison of estimates that were adjusted to reflect sociodemographic differences among the Services showed few differences from comparisons of unadjusted estimates. This finding indicates that the observed differences among the Services largely were not explained by differences in sociodemographic composition of the Services.

4.8.3 Patterns of Alcohol Use

Average daily use of ethanol and heavy drinking decreased among military personnel, and for most military personnel, drinking was not heavy or frequent.

- Overall, 79.6% of military personnel were drinkers and they consumed on average 0.81 ounces of ethanol per day (Tables 3.1 and 4.1).

- Beer was the alcoholic beverage of choice, consumed by 68.4% of total DoD personnel; wine was consumed by 28.8% and liquor by 42.8% of military personnel (Table 4.3).

- Military personnel were most likely to drink less than weekly and to consume on average 1 to 3 drinks per occasion (Table 4.3).

4.8.4 Correlates of Alcohol Use

Surveys of military and civilian populations have established certain patterns in alcohol use among sociodemographic groups that are useful in targeting prevention and treatment efforts.

- For the total DoD and each of the Services, the percentage of heavy drinkers was substantially higher among males than among females (17.1% of males in the total DoD vs. 4.4% of females).

- For the total DoD, the prevalence of heavy drinking was also higher among less educated personnel (22.4% of personnel with a high school education vs. 4.7% with a college degree); among younger personnel (24.5% of personnel ages 20 and under vs. 7.0% of personnel ages 35 and older); and among unmarried persons (23.7%),

compared to personnel who were unaccompanied (15.8%) or accompanied (9.5%) by their spouses (Table D.5).

- The percentage of heavy alcohol users was higher among junior enlisted personnel than among officers and was substantially higher among personnel in pay grades E1-E3 (28.2%), compared to personnel in other pay grade groups (Table D.5).

- Among junior enlisted personnel, heavy alcohol use was highest for the Army and the Marine Corps and lowest for the Navy and the Air Force (Table 4.2).

- When we used logistic regression analyses to control for the effects of other variables, race/ethnicity, family status and drinking to alter one's mood or to get drunk were significant predictors of heavy drinking, regardless of whether personnel were enlisted men, enlisted women, or officers (Tables 4.4 through 4.6). Blacks were less likely than whites to be heavy drinkers. Heavy drinkers were more likely to be found among single persons, and among personnel who were more likely to drink for the purpose of altering their mood or for getting drunk.

- Among enlisted men, pay grade was a significant predictor of heavy drinking when we considered only demographic variables, but when we included behavioral and psychosocial variables in the regression model, pay grade was no longer significant (Table 4.4). This result suggests that there was considerable overlap between pay grade and psychosocial variables. For example, many male junior enlisted personnel may have drunk for the purpose of getting drunk.

- Education was a significant predictor of heavy drinking among enlisted males and officers, but not among enlisted females (Tables 4.4 through 4.6). Enlisted males and officers with no further education beyond high school were more likely to be heavy drinkers than were personnel with at least some education beyond high school.

- Warrant officers were more likely to be heavy drinkers than were officers in other pay grade groups (Table 4.6).

4.8.5 Military Job and Alcohol Use

Drinking can impair combat readiness and overall productivity, and the military workplace can itself generate higher levels of alcohol use.

- Heavy alcohol use was more likely among enlisted personnel than among officers, and was highest among enlisted personnel in direct combat and craftsman occupations (Table 4.7).

- Relatively few military personnel (6.2% of all personnel, 6.5% of enlisted personnel and 4.4% of officers) reported drinking on any of the following occasions: within 2 hours of going to work, during lunch break, or during work or work break in the past 30 days (Table 4.8). These rates are significantly lower than in 1988 when

10.0% of all military personnel engaged in one or more of these behaviors.

- Military personnel who perceived being under a great deal, a fairly large amount, or some stress at work were more likely to be moderate/heavy or heavy drinkers (45.0%, 42.8%, 41.4%, respectively) than those who perceived being under little or no stress (34.8% and 31.0%, respectively; see Table 4.10). However, regression analyses indicated that perceived work-related stress was not a significant predictor of heavy drinking after we controlled for the effects of other psychosocial variables, as well as for the effects of demographic and behavioral variables. These results suggest that perceived work-related stress may be highly related to other variables that are strong predictors of heavy drinking.

4.8.6 Military and Civilian Comparisons

Although comparisons of unstandardized rates of drinking levels and heavy drinking among military personnel and civilians showed that military personnel were much more likely to drink and to drink heavily, the observed differences may have been partially due to differences in the sociodemographic composition of the military and civilian populations (Tables 4.11 and 4.12; Figure 4.6).

- Standardized comparisons, which took into account differences in sociodemographic composition, still showed substantial differences between alcohol use patterns of military personnel and civilians.

- Military personnel overall and military men were significantly more likely to drink heavily than were their civilian counterparts (14.5% of all military personnel vs. 9.5% of civilians; 16.2% of military men vs. 10.5% of civilian men).

- The rate of heavy drinking for military men aged 18 to 25 was roughly twice as high as for civilians (25.9% vs. 13.8%).

- The rate of heavy drinking among women in the military (4.3%) was not significantly different from the standardized rate among civilian women (3.5%).

Taken together, these findings suggest that the military has made some gains in reducing any alcohol use and heavy alcohol use among its personnel but that much more work is still needed. Average daily alcohol intake in 1992, measured in ounces of ethanol, was at its lowest level since the Survey series began in 1980. The prevalence of heavy alcohol use decreased significantly from 1980 to 1992 for the total DoD, the Navy, and the Air Force. Only the Air Force showed a significant decrease from 1988 to 1992. Further, the rate of heavy drinking for the Army in 1992 was roughly unchanged relative to 1980, and the Marine Corps showed no significant declines in heavy drinking across the entire Worldwide Survey series. Of course, as noted in Chapter 3, the reductions in heavy alcohol use between 1980 and 1992 appear to be more a reflection of changes in

sociodemographic composition of the military than a result of programmatic efforts to reduce heavy drinking. That is, the military in 1992 is less likely to consist of high-risk groups than in 1980.

However, some of the differences among Services in heavy drinking rates in 1992 are attributable to sociodemographic differences of personnel. This is particularly true for Marine Corps personnel who showed the highest rates of heavy drinking. If sociodemographic characteristics of the Services were the same, then heavy drinking rates for the Marine Corps would be expected to be about the same as the rates for the Army.

5. ILLICIT DRUG USE

In this chapter we examine drug use among military personnel, including trends in use, Service comparisons of drug use, prevalence of specific drugs and classes of drugs, frequency of drug use, correlates of drug use, and the relationship between the military job and drug use. We compare these findings to prior surveys of military and civilian populations. We have included supplemental tables on drug use, including more detailed information about drug use among the pay grades and regions of the world, in Appendix D.

5.1 Prior Studies

A series of surveys has examined the prevalence and correlates of drug use among civilians and military personnel. The major source of information on drug use among civilians is a series of related national surveys that began in 1971, while information on drug use among military personnel is available from the Worldwide Surveys and from a number of surveys of the individual Services.

Drug use steadily declined during the 1980s for both civilians and military personnel, with the decline among civilians continuing into the 1990s. Civilian surveys have documented a decrease in the use of most drugs that began after 1979, while surveys of military personnel have found a downward trend in drug use since at least 1980 when the first Worldwide Survey was conducted. Thus, drug use for both civilians and military personnel began to decrease during the late 1970s and early 1980s. Direct comparisons of the prevalence of drug use and trends across military and general population surveys can be misleading, however, because--as noted in Chapter 4--military and civilian populations differ substantially in sociodemographic characteristics (e.g., the average age of members of the military is much younger than the average age of the civilian population). The rate of drug use is significantly related to several of these demographic characteristics so differences in the prevalence of drug use from military and civilian population studies may, in part, reflect the sociodemographic composition of the two groups. This section examines data supporting these conclusions about decreases in use from surveys of civilian and military populations, and from studies that compare the two.

5.1.1 Civilian Populations

The National Household Survey on Drug Abuse (NHSDA), conducted periodically since 1971, traces trends in the use of illicit drugs for youth and adults. The 1971 and 1972 surveys were conducted for the National Commission on Marijuana and

Drug Abuse; the 1974 and later surveys have been sponsored by the National Institute on Drug Abuse (NIDA). The series shows that the use of most drugs began a downward trend after a peak in 1979 (Clayton, 1991).

Results from the 1990 NHSDA indicated a slight, but not statistically significant, decline relative to 1988 for past-year and past-month use of any illicit drug for all age groups. In 1990, 13.3% of individuals aged 12 and older reported having used illicit drugs in the previous year (NIDA, 1991a). This number was slightly lower than the 14.1% in 1988 (NIDA, 1990). This slight decline in past-year use of any drug between 1988 and 1990 continued the general downward trend that has been observed since 1979 (NIDA, 1991a). The most notable change between 1988 and 1990 was the decline in past-month use of cocaine. Among those 18 to 25 years old, cocaine use dropped significantly from 4.5% to 2.2%; among those aged 26 and over, past-month use dropped slightly, but significantly, from 0.9% to 0.6%.

Usage rates varied across different groups. More males reported drug use than females, and use was most likely among those aged 18 to 25, followed by those 26 to 34 years old. In 1990, as noted above, 13.3% of persons aged 12 and over reported any illicit use of drugs in the past year; comparable figures were 28.7% for those aged 18 to 25 (33.5% for males and 24.1% for females) and 21.9% for those aged 26 to 34 (25.4% for males and 18.5% for females). For marijuana, the most commonly used drug, 10.2% of the total population reported use during the past year; comparable figures for those aged 18 to 25 were 24.6% and for those aged 26 to 34, 18.0%. Comparable figures for past-year use of cocaine were 3.1% for the total population, 7.5% for those aged 18 to 25, and 6.8% for those aged 26 to 34 (NIDA, 1991a).

Similar declining trends in drug use have been observed among high school seniors, surveyed since 1975 in conjunction with the Monitoring the Future Surveys conducted by the University of Michigan (Johnston, O'Malley, & Bachman, 1991). Because many military recruits are drawn from high school graduating classes, prevalence figures for high school seniors may be predictive of drug use among entering personnel. An estimated 31.0% of high school seniors surveyed in 1975 had used illicit drugs during the past month. This percentage peaked with the classes of 1978 and 1979 at 38.9% and steadily declined to 17.2% for the class of 1990. The use of marijuana during the past month increased from 27.1% in 1975 to a high of 37.1% in 1978 and has declined steadily thereafter. In 1990, 14.0% of high school seniors reported having used marijuana during the past month, 3.7% reported having used stimulants, 2.2% hallucinogens, and 1.9% cocaine. The prevalence of use of other drugs was lower.

The same downward trend has occurred with lifetime use. In 1990, 47.9% of high school seniors reported that they had used illicit drugs at least once, down from 65% in 1979-82. Approximately 40% of the high school seniors reported that they had ever used

marijuana, about 18% had used inhalants, 17% had used stimulants, just under 10% reported use of cocaine or hallucinogens at least once, and fewer had used other drugs. Thus, as with adults and youth participating in the NHSDA, the Monitoring the Future Surveys found that drug use among high school seniors had declined after a peak in the late 1970s. However, almost one in six high school seniors in 1992 used drugs in the past month.

5.1.2 Military Populations

Data on drug use among military personnel are available from the Worldwide Surveys conducted in 1980, 1982, 1985, and 1988, as well as from surveys of the individual Services. As noted in Table 3.1 in Chapter 3 on substance use trends, drug use declined dramatically between 1980 and 1988. The prevalence of any drug use by DoD personnel during the past 30 days steadily declined from 27.6% in 1980 to 4.8% in 1988. These declines between each survey were statistically significant. Marijuana use in the past month declined from 26.0% of all personnel in 1980 to 16.5% in 1982, to 6.5% in 1985, and then to 2.7% in 1988 (Bray et al., 1988).

In 1988, use of any drug during the past 30 days was highest among Army personnel (11.8%) and Navy personnel (11.3%), followed by Marine Corps personnel (7.8%) and Air Force personnel (3.8%). Part of this difference among the Services is accounted for by differences in the sociodemographic composition of the Services. Air Force personnel were more likely to be older, better educated, and married, characteristics associated with a lower likelihood of drug use. Standardizing the Service prevalence rates by age, marital status, and education reduced the magnitude of Service differences, but Air Force rates remained significantly lower than Army, Navy, and Marine rates (Bray et al., 1988).

Comparable statistics from the Soldier Survey series of the Department of the Army (1986) indicate that marijuana use declined substantially among first-term and career soldiers between 1974 and 1985, except for a slight spike in 1981. The use of drugs other than marijuana has shown a long-term decrease since 1974 but a slight increase after 1983, with the increase possibly reflecting a shift from marijuana to other drugs. A rapid decrease in rates after 1981 may be attributed to increased urinalysis testing and the initiation of mandated actions against drug abusers. Data from the Marine Corps survey in 1983, combined with data from the 1980 and 1982 Worldwide Surveys, indicate a decline in marijuana use during the past 30 days from 36% in 1980 to 17% in 1982 and to 15% in 1983; any drug use declined from 37% to 21% and then to 17% (Stoloff & Barnow, 1984).

5.1.3 Military and Civilian Comparisons

Before valid comparisons can be made between military and civilian populations, it is important to control for the differences in their sociodemographic compositions in the analyses (i.e., standardization). Because military personnel are predominantly young and male--both factors associated with higher rates of drug use--we could expect that unstandardized military rates would be substantially higher than civilian rates.

Burt, Biegel, Carnes, and Farley (1980) used data from the 1980 Worldwide Survey to conduct standardized comparisons of drug use among military personnel and civilians. They found that the prevalence of drug use among military personnel was higher for some drugs but lower for others. Bray et al. (1983) compared 1982 data on drug use among male civilians and military personnel aged 18 to 25. As with earlier analyses by Burt and associates, civilians had higher prevalence rates for marijuana and cocaine, but military personnel had higher rates for drugs such as hallucinogens and stimulants. Because comparable civilian data were not yet available at the time the report was prepared, Bray et al. (1986) conducted no standardized comparisons of military and civilian drug use in analyses of the 1985 Worldwide Survey. Bray, Marsden, and Wheeless (1989; see also Bray, Marsden, & Peterson, 1991) subsequently compared military and civilian illicit drug use using the 1985 Worldwide Survey results and found use of any illicit drug among the military significantly lower than in the civilian population.

Considered together, data from both civilian and military studies show that drug use varies by age group and among civilians is more common among men than women. As findings from the 1990 NHSDA demonstrate, the differences between age and sex groups are substantial. Across all age groups in 1990, 15.5% of males and 11.4% of females reported any illicit drug use within the past year. Prevalence of any drug use ranged from 15.9% among those aged 12 to 17 to 28.7% among those aged 18 to 25, to 21.9% among those aged 26 to 34, and to 6.0% among those aged 35 and older. Other differences, such as among race and ethnic groups or across regions of the country, were less dramatic (NIDA, 1991a).

5.2 Trends in Drug Use

Drug use reported by military personnel has declined steadily since 1980 when the Worldwide Survey series began. From a high of 27.6% of all military personnel reporting drug use during the past 30 days in 1980, prevalence declined to 19.0% in 1982, 8.9% in 1985, 4.8% in 1988, and finally to 3.4% in 1992. Table 3.1 in Chapter 3 shows these percentages. Each of the decreases observed in previous surveys was statistically significant over the prior measurement as was the decline between the 1988 and 1992 surveys. Use decreased almost 30% from 1980 to 1982, 53.2% from 1982 to 1985, 46.1% from 1985 to 1988, and 29.2% from 1988 to 1992. The total decrease between 1980 and

1992 was 87.7%. This time period was also marked by substantial decreases in drug use among civilians. Part of the observed decline may thus reflect broader societal trends. However, the steeper decline among military rates compared to civilian rates (Bray, Marsden, & Peterson, 1991) indicates the effectiveness of military efforts to reduce drug use among military personnel.

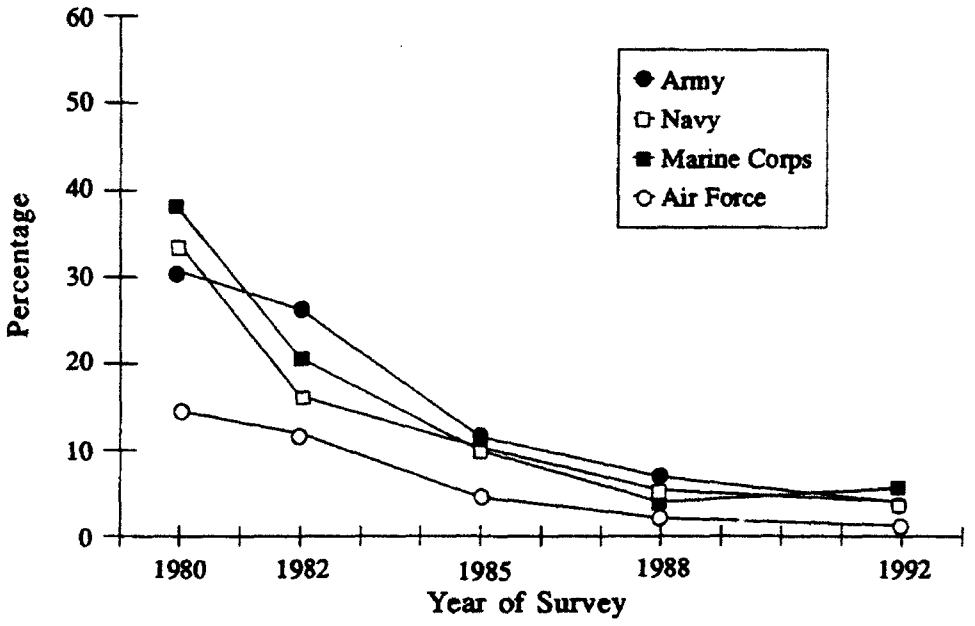
These decreases in any drug use for total DoD personnel are also apparent for personnel in each of the Services, as shown in Figure 5.1. All four Services showed a large and significant decline in drug use during the 12-year period between 1980 and 1992. Each of the Services had at least one period during the 12 years in which the decrease was not significant, although the estimates were always in the downward direction through 1988. The declines between the 1988 and 1992 surveys were statistically significant for the Army and the Air Force, which has consistently had the lowest rates across all of the surveys. No statistically significant change was observed between 1988 and 1992 for the Navy or for the Marine Corps. However, the Marine Corps data had an anomaly in that the trend line showed an apparent upturn. Although it was not a statistically significant shift (see Figure 5.1), it is the first time since 1980 that the trend line for any of the Services has not maintained a downward pattern. To begin to understand the reasons for the discontinuity in the trend line for the Marine Corps, we examined drug use rates in 1988 and 1992 by pay grade and region. Our results showed a statistically significant increase among junior enlisted Marines (E1-E3s) who were stationed in the Americas. For this group, 20.3% reported any drug use in the past year, up from 9.6% in 1988. Similar analyses for other Services showed no significant changes among pay grade groups between 1988 and 1992.

In addition to considering the trends for any illicit drug use, we also examined the trends in drugs of choice since 1985. We compared the drugs with the highest rates of use for each of the surveys. We found that five drugs/drug classes accounted for most illicit drug use: marijuana, cocaine, hallucinogens, amphetamines, and analgesics. Figure 5.2 presents the prevalence data. As shown, marijuana was the drug of choice across the three surveys. In 1985 and 1988, cocaine was the second most commonly used drug, followed by the other three drugs. In 1992, however, amphetamine use declined and military personnel used hallucinogens and analgesics as often as cocaine. The shift in the pattern is accounted for primarily by the decline in cocaine use down to the level of the other drugs.

5.3 Service Comparisons

In this section, we provide two sets of estimates of the observed extent of drug use for each of the Services. We begin by presenting actual or unadjusted estimates for each of the Services. These estimates, which indicate observed prevalence rates in 1992, provide a perspective on the comparative magnitude of the challenge facing each of the

Figure 5.1 Trends in Any Illicit Drug Use, Past 30 Days, by Service, 1980-1992



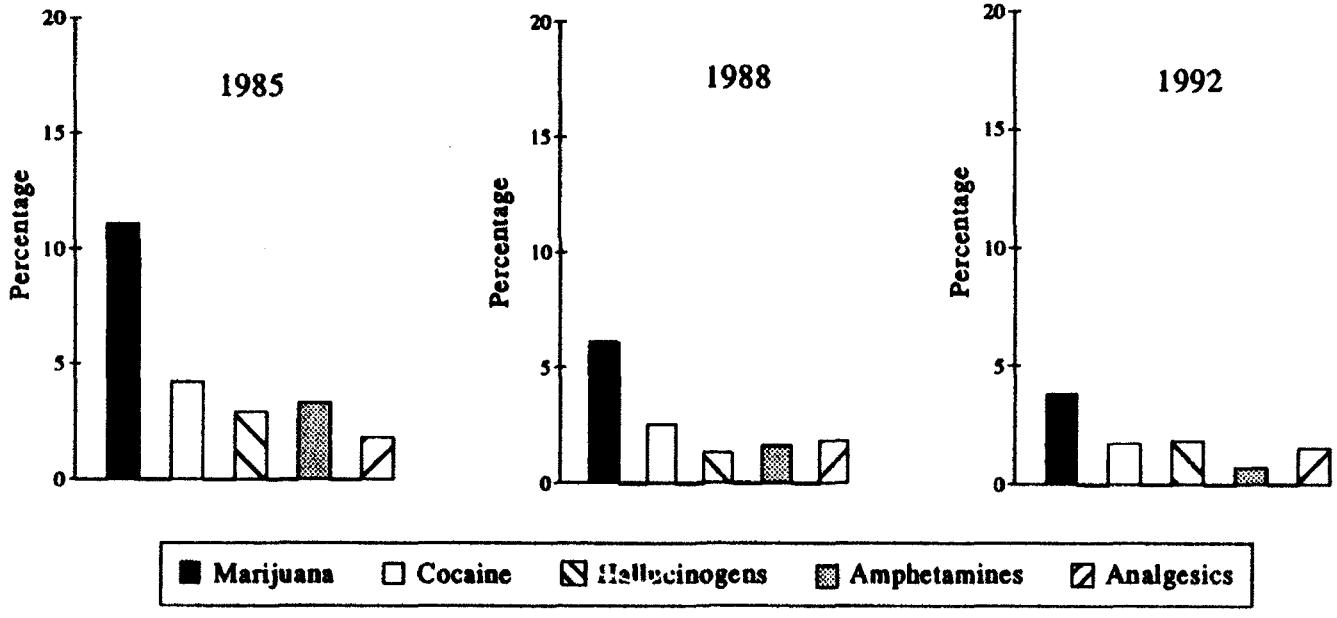
Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Services in its efforts to eradicate drug use. These unadjusted estimates are descriptive only, however, and yield no explanatory information on the differences among the Services. As discussed in Section 2.7, one possible explanation for observed Service differences in drug use across the Services is differences in the sociodemographic composition of the Services. Thus, we also provide adjusted estimates using regression-based standardization procedures to control for these differences. The adjusted, constructed estimates permit comparisons among the Services, assuring that the sociodemographic composition of all four is the same.

Both unadjusted and adjusted estimates of drug use prevalence for the individual Services are shown in Table 5.1. Because marijuana has been the most commonly used drug, data are presented separately for any drug use, marijuana use, and any drug use except marijuana. The last category includes a broad range of drugs, ranging from hallucinogens to cocaine and prescription psychotherapeutic drugs.

Figure 5.2 Trends in Drugs of Choice, Past 12 Months, Total DoD, 1985-1992



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 5.1 Estimates of Drug Use, Past 12 Months, Unadjusted and Adjusted for Sociodemographic Differences

	Service			
	Army	Navy	Marine Corps	Air Force
Marijuana				
Unadjusted	5.1 (0.8)[a]	3.8 (1.2)[b]	7.8 (1.2)[a]	0.8 (0.1)
Adjusted[c]	5.4 (0.6)[a]	3.7 (0.7)[a]	4.5 (0.6)[a]	1.2 (0.1)
Any Drug Except Marijuana[d]				
Unadjusted	5.4 (0.7)[a]	5.5 (2.0)	6.9 (1.4)[a]	1.7 (0.3)
Adjusted[c]	5.7 (0.6)[a]	5.0 (1.3)[a]	4.9 (0.6)[a]	2.0 (0.3)
Any Drug[e]				
Unadjusted	7.7 (0.8)[a]	6.6 (1.9)[a]	10.7 (1.3)[a]	2.3 (0.3)
Adjusted[c]	8.0 (0.7)[a]	6.2 (1.2)[a]	7.1 (0.7)[a]	2.8 (0.3)

Note: Entries are percentages (with standard errors in parentheses). Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps, etc.). Differences that were statistically significant are indicated.

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

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

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

[d]Any nonmedical use of PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, "designer" drugs, or inhalants.

[e]Same definition as "d" except marijuana is included in the set of drugs.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

5.3.1 Unadjusted Estimates

Unadjusted estimates of drug use showed the highest rate of any illicit drug use in the Marine Corps, with 10.7% reporting illicit drug use in the previous 12 months. The Marines also had the highest rates of marijuana use (7.8%) and use of any drug except marijuana (6.9%) (see Table 5.1). The Army had the next highest rate of past-year use of any drug (7.7%), followed by the Navy (6.6%). The difference in the rate of use of any drugs between these latter two Services resulted from greater use of marijuana in the Army. When we considered use of any drug other than marijuana, the two Services were nearly identical. Drug use among Air Force personnel was far below use for the other three Services, with 2.3% reporting use in the past year.

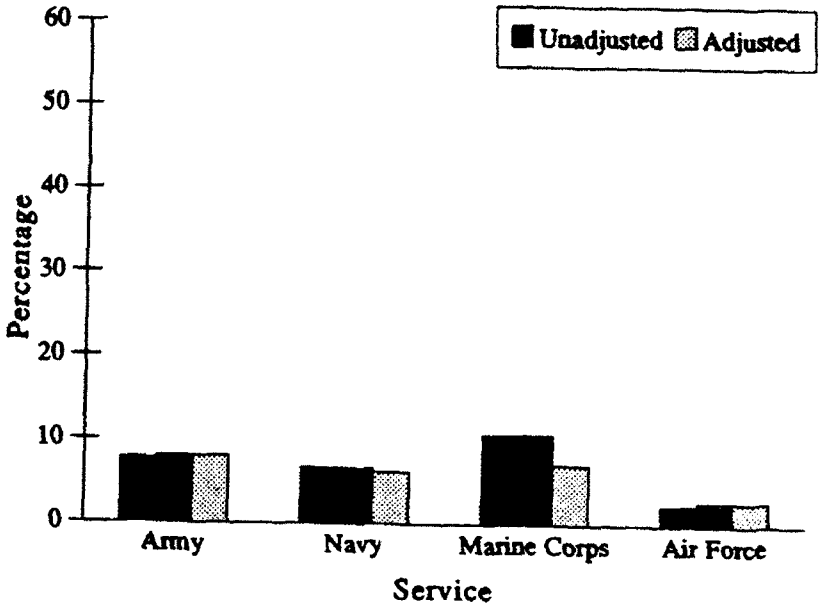
These findings show the relative challenges that the Services face in combating illicit drug use. The Marine Corps faces the largest challenge, the Air Force faces the smallest challenge, and the Army and Navy fall between them. The results present prevalence estimates, but do not examine any underlying explanations for Service differences in rates of illicit drug use. Adjusting for differences in sociodemographic compositions of the Services may explain some of the discrepancies.

5.3.2 Adjusted Estimates

Adjusting for sociodemographic differences had the largest impact on the Marines, with the estimates for use of any drug dropping a third (see Table 5.1 and Figure 5.3). Thus, the higher rate of drug use in the Marine Corps compared to the other Services is partially explained by the sociodemographic characteristics of Marine Corps personnel. When using standardized estimates, we found the highest rate of use in the Army for any drug, for marijuana only, and for any drug except marijuana. The next highest rate of use of any drug and marijuana was found among Marines, while the Navy had the second highest rate of use of any drug except marijuana. Although standardization increased the drug use rates for the Air Force, it also had the lowest rate of use even when we controlled for sociodemographic characteristics.

These data, coupled with the demographic profile of the Services (Table 2.4), suggest that the higher rate of drug use observed in the Marine Corps compared to the other Services is largely a function of having a higher proportion of high-risk personnel; once that factor is taken into account, rates of drug use among Marines appear to be on a par with rates for the Army. Stated differently, Marine Corps efforts to combat drug use appear to have been as effective as those of the Army; nonetheless, the Marine Corps faces a greater challenge than the other Services because it has a higher proportion of personnel at high risk for using drugs. The data also suggest that the Air Force rate of success is a function of both demographic factors and other factors, because Air Force rates of illicit drug use were significantly lower than rates for the other Services both before and after standardization.

Figure 5.3 Estimates of Illicit Drug Use, Past 12 Months, Unadjusted and Adjusted for Sociodemographic Characteristics



Note: Adjusted estimates have been standardized by sex, age, education, race/ethnicity, and marital status to the total DoD distribution.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

We also conducted standardizations across the four Worldwide Surveys to examine the effects of demographic changes in the military as an explanation for changes in drug use since 1980. In these analyses (reported in Table 3.2 in Chapter 3), we standardized estimates of the prevalence of any drug use in 1982, 1985, 1988, and 1992 for the total DoD to the 1980 age, education, and marital status distribution. For previous surveys, wherever we found significant survey year-to-survey year differences in drug use in the unstandardized results, we also found significant differences in the standardized results. For the 1992 Worldwide Survey results, we found a significant decline compared to 1988 using unstandardized estimates. The standardized comparisons between 1988 and 1992 indicate the decline was not significant.

Overall, these findings suggest that differences among the Services in sociodemographic composition remain viable as a partial explanation for some differences we observed in drug use, particularly between the Marine Corps and the Air Force. 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

sex, age, race/ethnicity, education, 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.

5.4 Prevalence of Specific Drugs

As overall drug use has declined across survey years, use of most of the individual drugs or types of drugs considered in this survey also declined. Table 5.2 presents the percentage of users of 11 specific drugs or drug classes during the 30 days or 12 months before the survey. A similar table for pay grades E1 to E3s is Table D.15 (Appendix D). As shown in Table 5.2, marijuana remained the most commonly used drug, with 1.5% of military personnel using it during the past month and 3.8% within the past year. Thirty-day use of each of the other drugs was less than 1%, except for analgesics, which was 1.1%; 12-month use of any specific drugs was less than 2% except for marijuana, which was 3.8%.

As noted in Figure 5.2 discussed earlier, there are some indications that use of perception-altering substances is increasing slightly. However, use of most specific drugs remained very low. Past-month use of LSD and hallucinogens was up to 0.9% from 0.4% in 1988. Past-month use of PCP, which is used as a psychedelic, was zero in 1992 but past-year use was 0.3%, up from 0.1% in 1988. We added "designer drugs," chemical variations of perception-altering drugs, to the questionnaire in 1988; 0.2% of military personnel reported past-month usage that year and 0.3% reported past-month use in 1992. Although very few military personnel had used perception-altering substances, there are indications of a slight increase since 1988 while use of all other drugs is on the decline.

In examining the prevalence of specific drugs for the individual Services, we found that use typically was highest in the Marine Corps, lowest in the Air Force, and around the midpoint in the Army and the Navy compared to the DoD total. This matches the pattern for use of any illicit drug. As noted above, however, some of the differences among the Services may have been due to sociodemographic differences.

We also examined use during the past 12 months for the individual Services of the same five drugs of choice presented in Figure 5.2 for the total DoD: marijuana, cocaine, hallucinogens, amphetamines, and analgesics. Figure 5.4 shows the Service comparisons. For 1992, the Army and Navy show similar patterns with highest use being marijuana, followed by cocaine, hallucinogens, and analgesics at roughly equal levels. In contrast, the Marines showed the highest rates of marijuana use followed by hallucinogens, then cocaine and analgesics. The rate of using marijuana and LSD or hallucinogens among

Table 5.2 Illicit Drug Use, Past 30 Days and Past 12 Months

Drug/Period of Use	Service									
	Army		Navy		Marine Corps		Air Force		Total DoD	
Marijuana										
Past 30 Days	1.8	(0.4)	1.8	(0.4)	3.0	(0.8)	0.3	(0.1)	1.5	(0.2)
Past 12 Months	5.1	(0.8)	3.8	(1.2)	7.8	(1.2)	0.8	(0.1)	3.8	(0.5)
Cocaine										
Past 30 Days	0.8	(0.4)	1.1	(0.7)	0.6	(0.3)	0.1	(**)	0.7	(0.2)
Past 12 Months	2.1	(0.4)	2.5	(1.4)	2.0	(0.8)	0.2	(0.1)	1.7	(0.5)
PCP										
Past 30 Days	**	(**)	0.1	(0.1)	**	(**)	0.1	(0.1)	**	(**)
Past 12 Months	0.2	(0.1)	0.4	(0.4)	0.5	(0.3)	0.1	(0.1)	0.3	(0.1)
LSD/Hallucinogens										
Past 30 Days	0.8	(0.3)	1.3	(0.7)	2.2	(0.7)	0.1	(0.1)	0.9	(0.2)
Past 12 Months	1.8	(0.4)	2.4	(1.4)	4.0	(1.0)	0.2	(0.1)	1.8	(0.5)
Amphetamines/Stimulants										
Past 30 Days	0.4	(0.1)	0.2	(0.1)	0.5	(0.2)	0.2	(0.1)	0.3	(0.1)
Past 12 Months	0.9	(0.3)	0.9	(0.4)	0.8	(0.5)	0.2	(0.1)	0.7	(0.2)
Tranquilizers										
Past 30 Days	0.4	(0.2)	0.2	(0.1)	0.4	(0.3)	0.2	(0.1)	0.3	(0.1)
Past 12 Months	0.9	(0.2)	0.4	(0.1)	0.8	(0.3)	0.3	(0.1)	0.6	(0.1)
Barbiturates/Sedatives										
Past 30 Days	0.2	(0.1)	0.2	(0.1)	**	(**)	0.1	(0.1)	0.1	(**)
Past 12 Months	0.5	(0.2)	0.3	(0.2)	0.3	(0.2)	0.1	(0.1)	0.3	(0.1)
Heroin/Other Opiates										
Past 30 Days	**	(**)	0.1	(0.1)	**	(**)	0.1	(**)	**	(**)
Past 12 Months	0.1	(0.1)	0.1	(0.1)	0.8	(0.6)	0.1	(**)	0.2	(0.1)
Analgesics										
Past 30 Days	1.0	(0.1)	1.3	(0.5)	1.5	(0.4)	0.7	(0.2)	1.1	(0.2)
Past 12 Months	1.5	(0.2)	1.8	(0.5)	1.9	(0.5)	1.0	(0.2)	1.5	(0.2)
Inhalants										
Past 30 Days	0.7	(0.2)	0.7	(0.4)	0.3	(0.2)	0.2	(0.1)	0.5	(0.1)
Past 12 Months	0.8	(0.2)	0.9	(0.4)	0.5	(0.5)	0.2	(0.1)	0.6	(0.2)
"Designer" Drugs										
Past 30 Days	0.2	(0.1)	0.5	(0.4)	0.5	(0.3)	0.1	(0.1)	0.3	(0.1)
Past 12 Months	0.6	(0.2)	0.6	(0.4)	0.8	(0.4)	0.1	(0.1)	0.5	(0.1)
Any Drug[a]										
Past 30 Days	3.9	(0.8)	4.0	(0.9)	5.6	(1.0)	1.2	(0.2)	3.4	(0.4)
Past 12 Months	7.7	(0.8)	6.6	(1.9)	10.7	(1.3)	2.3	(0.3)	6.2	(0.6)
Any Drug Except Marijuana[b]										
Past 30 Days	3.1	(0.6)	3.1	(1.0)	3.9	(1.0)	1.0	(0.2)	2.6	(0.4)
Past 12 Months	5.4	(0.7)	5.5	(2.0)	6.9	(1.4)	1.7	(0.3)	4.5	(0.6)
Anabolic Steroids										
Past 30 Days	0.1	(**)	0.1	(0.1)	0.6	(0.4)	0.2	(0.1)	0.2	(**)
Past 12 Months	0.5	(0.2)	0.1	(0.1)	0.9	(0.6)	0.2	(0.1)	0.3	(0.1)

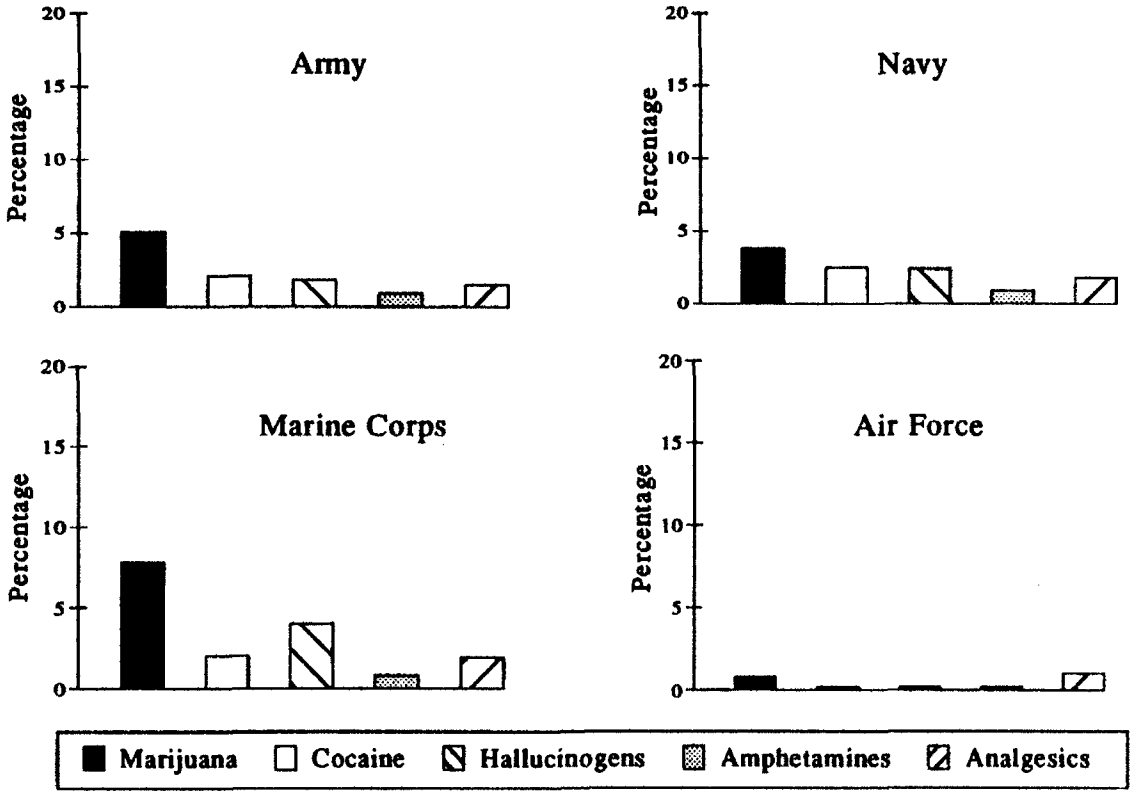
Note: Estimates have not been adjusted for sociodemographic differences among Services. Table values are percentages and represent prevalence estimates (with standard errors in parentheses).

[a]Nonmedical use one or more times of any of the above classes of drugs (steroids excluded).

[b]Nonmedical use one or more times of any of the above classes of drugs, excluding marijuana (steroids also excluded).

**Estimate rounds to zero.

Figure 5.4 Drugs of Choice, Past 12 Months, by Service, 1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Marines was more than double the rate for all military personnel for the same period. The Air Force showed marijuana and analgesics at roughly the same, but very low, levels. However, readers should be cautioned that these Service-specific estimates for individual drugs of choice have not been adjusted for sociodemographic differences among the Services.

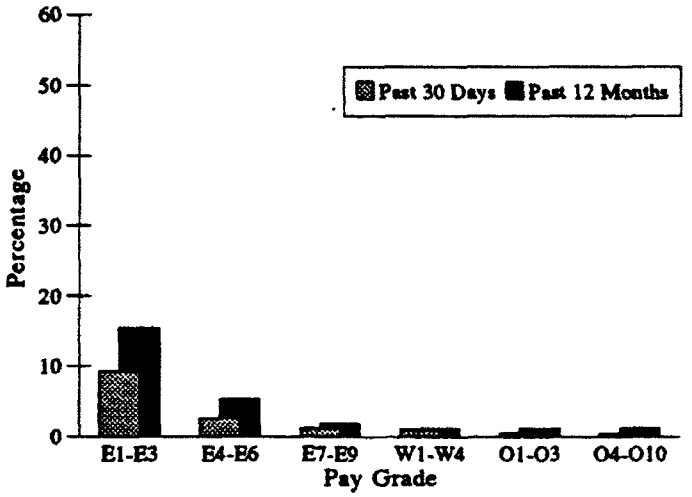
Much of the drug use among military personnel was concentrated among the lower pay grades. The percentages of users of any drug during the past 30 days and past 12 months for pay grade groupings are illustrated in Figure 5.5. The use of any drug during the past 30 days and 12 months was highest among the lower enlisted pay grades and declined monotonically across upper enlisted grades and officers. For the past 30 days, 9.3% of E1s to E3s and 2.7% of E4s to E6s reported drug use compared to about 1% or lower of personnel in the other pay grades. The pattern was similar--although at a higher rate--for 12-month use. As compared to the 1988 survey, we observed the largest absolute decline among E4s to E6s, where 30-day use went from 5.1% down to 2.7% and past-year use was down from 9.1% to 5.3%.

All Services showed the same pattern of findings noted for total DoD, with E1s to E3s having the highest prevalence rates, followed by E4s to E6s. Service comparisons of drug use rates for E1s to E3s are shown in Figure 5.6. There was a striking difference in drug use in the lower pay grades between the Air Force and the other Services, with only 1.8% of Air Force personnel using in the past month compared to over 10% for each of the other Services. Rate of use in the past year for Air Force E1s-E3s was less than a quarter of the rate for the other three Services. Past-month and past-year use among the lower pay grades in the Army, Navy, and Marine Corps were remarkably similar.

This similarity in use among the lower pay grades of the three Services contrasts markedly with comparisons among the same Services in 1988. In 1988, there were large differences in drug use among the lower pay grades across the Army, Navy, and Marine Corps. Also in 1988, use was highest in the Army, with 16.0% of E1s to E3s reporting use of one or more drugs during the past 30 days and 28.4% indicating use of drugs in the past year. These rates declined to 11.1% and 19.5% respectively in 1992 (Table D.13). Among Navy personnel in the lower grades in 1988, 9.7% reported 30-day use, and 24.0% indicated 12-month use. In 1992, past-month use increased to 11.6% while past-year use dropped to 17.8%. In 1988, E1s to E3s in the Marines showed 6.5% 30-day use and 10.5% 12-month use, which increased to 10.4% for past-month use and 17.8% for past-year use in 1992. Finally, with the Air Force, in 1988 use was at 3.2% for past month and 6.2% for past year. These percentages dropped to 1.8% and 4.3% respectively in 1992.

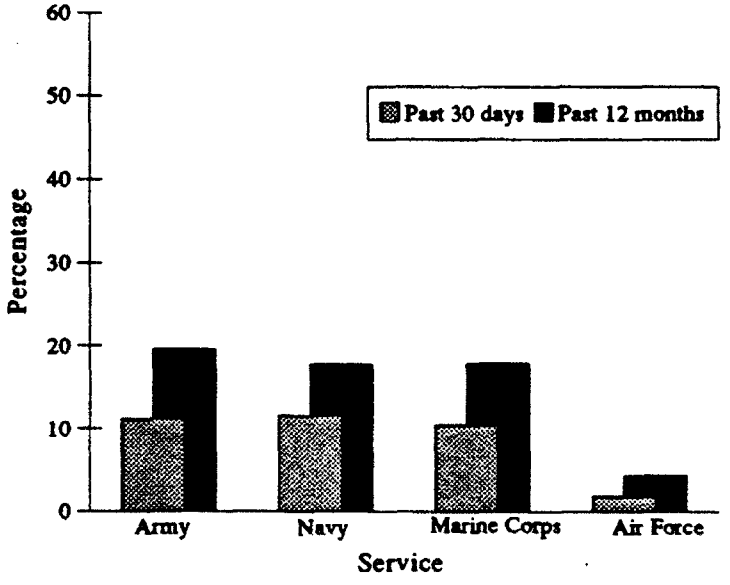
The 1992 questionnaire was the first time that questions on anabolic steroid use were included on the Worldwide Survey. Table 5.3 contains steroid prevalence estimates for enlisted personnel by pay grade and Service. Very few enlisted personnel reported use

Figure 5.5 Any Illicit Drug Use, by Pay Grade, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 5.6 Any Illicit Drug Use for E1-E3s, by Service



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 5.3 Anabolic Steroid Use for Enlisted Personnel, Past 30 Days and Past 12 Months, by Pay Grade

Pay Grade/Period of Use	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
E1-E3:					
Past 30 days	** (**)	+ (+)	1.3 (0.9)	0.5 (0.5)	0.5 (0.2)
Past 12 months	0.9 (0.9)	0.4 (0.4)	1.9 (1.3)	0.5 (0.5)	0.9 (0.4)
E4-E6:					
Past 30 days	0.1 (0.1)	** (**)	0.3 (0.2)	0.2 (0.1)	0.1 (**)
Past 12 months	0.6 (0.3)	** (**)	0.4 (0.2)	0.2 (0.1)	0.3 (0.1)
E7-E9:					
Past 30 days	0.2 (0.1)	** (**)	** (**)	0.1 (0.1)	0.1 (0.1)
Past 12 months	0.2 (0.1)	** (**)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)
Total Enlisted:					
Past 30 days	0.1 (0.1)	0.1 (0.1)	0.7 (0.4)	0.2 (0.1)	0.2 (0.1)
Past 12 months	0.6 (0.2)	0.1 (0.1)	1.0 (0.6)	0.2 (0.1)	0.4 (0.1)

Note: Estimates have not been adjusted for sociodemographic differences among Services. Entries are percentages (with standard errors in parentheses).

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

of steroids, with 0.2% using in the past month and 0.4% in the past year. As with other drugs, use was heaviest among the lowest pay grades with 0.5% of E1s to E3s using in the past month and 0.9% in the past year. Analyses of officers (not shown in Table 5.3) also indicated that steroid use was virtually nil among this group.

These results that drug use prevalence was highest among junior enlisted personnel agree with findings of prior Worldwide Surveys. The findings suggest that prevention, intervention, and treatment efforts should be closely targeted to personnel in the lower pay grades. Marijuana continues to be the most commonly used drug, followed by analgesics, cocaine, and hallucinogens. There were indications of an increase in the use of perception-altering drugs, including LSD or hallucinogens, PCP, and "designer drugs."

5.5 Frequency of Drug Use

We can conclude from the Worldwide Survey series that the vast majority of military personnel do not use drugs. Those that do use can be divided into frequent users and occasional users. We present the 1992 frequency of any drug use among enlisted personnel during the past 30 days in Table 5.4. We have shown estimates only for enlisted personnel because drug use was minimal among officers. For all enlisted personnel, 96.1% reported no use within the past 30 days, 2.4% used drugs 1 to 3 times during the month, 0.8% used drugs 4 to 10 times, and 0.6% used drugs more than 10 times. Thus, use 1 to 3 times during the month, rather than more frequent use, was the most common pattern.

Table 5.4 Frequency of Any Illicit Drug Use (Excluding Steroids) for Enlisted Personnel, Past 30 Days

	Service				
Pay Grade/Days Used	Army	Navy	Marine Corps	Air Force	Total DoD
E1-E3					
None	89.0 (3.8)	88.4 (4.0)	89.6 (2.0)	98.2 (0.8)	90.8 (1.7)
1-3	6.4 (1.7)	6.3 (2.7)	6.3 (2.6)	1.4 (0.8)	5.4 (1.2)
4-10	2.7 (1.3)	3.3 (1.4)	2.4 (1.6)	0.3 (0.3)	2.4 (0.7)
11-30	2.0 (1.3)	1.9 (1.0)	1.7 (0.6)	** (**)	1.5 (0.4)
E4-E6					
None	96.3 (0.6)	97.5 (0.3)	96.8 (1.0)	98.5 (0.3)	97.3 (0.2)
1-3	2.1 (0.4)	1.6 (0.3)	2.9 (0.9)	1.2 (0.2)	1.8 (0.2)
4-10	1.0 (0.3)	0.4 (0.2)	0.3 (0.2)	0.1 (0.1)	0.5 (0.1)
11-30	0.6 (0.2)	0.5 (0.2)	** (**)	0.2 (0.1)	0.4 (0.1)
E7-E9					
None	98.3 (0.4)	99.0 (0.5)	99.2 (0.3)	99.0 (0.2)	98.8 (0.2)
1-3	1.0 (0.2)	0.6 (0.4)	0.6 (0.3)	0.7 (0.2)	0.8 (0.2)
4-10	0.2 (0.1)	0.1 (0.1)	** (**)	** (**)	0.1 (0.1)
11-30	0.5 (0.2)	0.4 (0.2)	0.2 (0.2)	0.3 (0.1)	0.4 (0.1)
Total Enlisted					
None	95.4 (0.9)	95.6 (1.1)	93.8 (1.1)	98.5 (0.2)	96.1 (0.5)
1-3	2.6 (0.6)	2.6 (0.7)	4.2 (0.9)	1.2 (0.2)	2.4 (0.3)
4-10	1.2 (0.3)	1.0 (0.4)	1.2 (0.9)	0.1 (0.1)	0.8 (0.2)
11-30	0.8 (0.2)	0.8 (0.2)	0.8 (0.3)	0.2 (0.1)	0.6 (0.1)

Note: Table values are column percentages and represent prevalence estimates with standard errors in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

This tendency for infrequent use is apparent across all Services and enlisted pay grades. E1s to E3s were more likely than other enlisted groups to be users and frequent users. Weekly use (i.e., 4 or more times in the past month) among E1s to E3s was similar across the Army, Navy, and Marine Corps, ranging from 4.1% for the Marine Corps to 4.7% for the Army, and 5.2% for the Navy. Again, the pattern for the Air Force was quite different from that for the other Services, with only 0.3% of junior enlisted personnel reporting weekly or more frequent use. Thus, in the 1992 survey, drugs tended to be used only on occasion, not daily or even weekly by most users. Although frequent use of drugs among drug users was not the norm, frequent use was slightly more common among the lower pay grades and differed somewhat by Service.

5.6 Correlates of Drug Use

Drug use is most common among young persons and is more common among men than among women, according to the results of a variety of epidemiological studies among civilian populations. However, previous Worldwide Surveys have found that past-month drug use rates have been remarkably similar among men and women in the military (26.6% vs. 26.7% in 1982; 13.5% vs. 12.0% in 1985; 9.0% vs. 8.4% in 1988). The 1992 survey showed that among military personnel, drug use also was more common among younger persons and, unlike earlier Worldwide Surveys, was substantially different between men and women. Use also varied across other groups.

5.6.1 Descriptive Findings

We have shown the percentages of military personnel in selected sociodemographic groups who reported having used any drug during the past year in Table D.12 (Appendix D). Detailed tables of any drug use by pay grade and region also appear in Appendix D, Tables D.13 to D.17. Age was perhaps the strongest correlate of drug use, but we also found substantial differences between males and females and among personnel who differed on race/ethnicity, educational status, family status, and pay grade.

Drug use among some groups varied by a factor of two or three or more for past-year use. Males were nearly twice as likely to be users compared to females (6.7% versus 3.4%). This is a change from the 1988 survey, where use was quite similar for the two groups. Hispanics had the highest rate of use in the past year (8.9%), while blacks (4.2%) and those categorized as "other" (4.4%) had the lowest rates. Again, the differences across racial/ethnic groups in the 1992 survey were not present in 1988.

Use also varied across educational level, with past-year use among those with a high school education at 9.0%. Use was much lower among those who had attended some college (5.5%) or were college graduates (1.9%). Age also was significant factor; more than 10% of those under age 25 reported use while less than 5% of those older reported using

drugs in the past year. Those married with spouse present were also much less likely to use drugs (3.6%) than those who were not married (9.9%) or were married with their spouse not present (7.1%).

About 15% of personnel in pay grades E1 to E3 and 5% of personnel in pay grades E4 to E6 used drugs in the past year compared with 2% or fewer of other pay grade groupings. Findings for the individual Services were similar to these for the total DoD. One notable exception was race/ethnicity with the Marine Corps. In this case, unlike the other Services, the highest rate of use was among whites (12.9%). Note that several of these characteristics--pay grade and even marital status--are strongly related to age. Thus, 1992 drug use among military personnel appears to have been strongly related to age, sex, racial/ethnic group, education, and marital status.

5.6.2 Multivariate Analysis of Any Drug Use

We estimated separately two multivariate logistic regression models for enlisted males, using the probability of any drug use in the past month as the dependent variable. The rate of drug use among enlisted females and officers was very low and, hence, we developed no models for them. The first model, the basic model, contained the standard demographic variables; the second model, the full model, enhanced the basic model by adding eight psychosocial variables. Only the full model is discussed in detail here. The health practices variable is described in detail in Chapter 10. The remaining six psychosocial variables measured attitudes, beliefs, and perceptions concerning drug use. They are noted briefly here and described in more detail in Appendix E.

1. An index measuring beliefs about the harmful effects of drugs comprised four Likert-scaled items measuring the extent of agreement with statements such as "using drugs would mess up my mind."

2. An index of drug use motivation comprised three items measuring the extent of agreement with items such as "I would be more inclined to use drugs if the military did not have urinalysis testing."

3. An index of perceptions of installation drug use norms included three items such as "at parties or social functions at this installation, it's easy to get away with using drugs."

4. An index of perceptions of significant others' drug use norms comprised three items measuring the extent of agreement with statements such as "the people I associate with off-duty think that I should not use marijuana (or would disapprove if I did use marijuana)."

5. Perceptions of the installation drug treatment climate were measured by the extent of agreement with items such as "persons who want treatment for their drug problems have difficulty getting off-duty to attend counseling sessions."

6. The final index measured attitudes towards marijuana use and consisted of five items measuring the extent of agreement with items such as "anyone detected using marijuana should be discharged."

Service, family status, region, pay grade, job stress, personal inclinations toward drug use, perceived social disapproval, and attitude toward marijuana use were significantly related to the probability of any drug use in the past 12 months for enlisted males (Table 5.5).

The probability of drug use for enlisted males was higher among:

- Army and Navy personnel than Air Force personnel,
- those who were single or married with spouse absent than those who were married with spouse present,
- those stationed in the Americas than those stationed in Europe,
- those in pay grades E1-E3 than those in pay grades E7-E9,
- those with high or moderate perceived stress at work compared to those who perceived low stress,
- those who were more inclined to use drugs in the absence of drug testing,
- those who scored lower on the social disapproval index, and
- those who had more favorable attitudes toward marijuana use.

The odds of drug use in the Army were 74% higher than the corresponding odds for the Air Force, while the odds of drug use in the Navy were 53% higher than for the Air Force. The odds of drug use were 40% higher for single personnel than for married personnel whose spouse was present, while the odds for married personnel whose spouse was absent were 2.26 times higher than the odds for married personnel whose spouse was present. The odds of drug use for personnel stationed in the Americas were 88% higher than the odds for those stationed in Europe. The odds of drug use were 2.45 times higher for E1-E3s than for E7-E9s. The odds of drug use for those experiencing high and moderate levels of job stress were 3.13 and 2.76 times higher, respectively, than the odds for those experiencing low levels of job stress.

Each unit increase on the scale measuring inclination to use drugs in the absence of drug testing increased the odds of drug use by 28%. Each unit increase in the social disapproval index decreased the odds of drug use by 12%. Likewise, each unit increase toward the negative end of the attitude towards marijuana use index decreased the odds of drug use by 12%.

Table 5.5 Significant Odds Ratios for Predicting Any Drug Use, Past 12 Months, Enlisted Males (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Army vs. Air Force	1.74**	1.16	2.59
Navy vs. Air Force	1.53*	1.04	2.24
Family Status			
Single vs. married, spouse present	1.40*	1.09	1.82
Married, spouse not present vs. married, spouse present	2.26*	1.06	4.81
Region			
Americas vs. Europe	1.88*	1.14	3.09
Pay Grade			
E1-E3 vs. E7-E9	2.45**	1.38	4.37
Stress at Work			
High vs. low	3.13**	1.47	6.65
Moderate vs. low	2.76*	1.24	6.14
Inclination to Use Drugs in Absence of Testing	1.28***	1.22	1.34
Social Disapproval Index	0.88***	0.82	0.93
Attitudes About Marijuana Use	0.88***	0.85	0.90

*95% CI = 95% confidence interval of the odds ratio.

*p<.05 **p<.01 ***p<.001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

The psychological constructs were relatively more important predictors of drug use than the demographic variables. In the basic demographic model, age and race/ethnicity were significant predictors of drug use, while in the full model they were no longer significant. It appears that age and race/ethnicity differences in drug use can be accounted for by psychological differences among these groups, which in turn are related to drug use. Furthermore, the significance levels of the demographic variables that still remained significant in the full model decreased and the parameters associated with them, in most cases, became noticeably smaller.

These logistic regression analyses suggest that drug use prevention and treatment efforts might best focus on lower pay grade personnel in the Army who are married with spouse not present. Since job stress seems to have been a particularly important correlate

of drug use, stress reduction programs might be beneficial. Also, because attitude towards marijuana was an important predictor of drug use, media programs designed to increase negative attitudes toward drug use could be beneficial.

5.7 Military Job and Drug Use

In Table 5.6, we present information on drug use among enlisted personnel in the past year by occupation. (Drug use rates were too low among officers to conduct a similar analysis.) Across DoD, the occupational groups with the highest rates of drug use in the past year were direct combat (10.9%) and health care (10.5%). In contrast, the group with the lowest drug use rate was electronic equipment repair (4.3%). There was some variation in this pattern among the Services although some estimates for the Services were unreliable based on their large standard errors. Drug use rates for personnel with a direct combat occupation were high for the Army and Marine Corps. Drug use among health care workers was particularly high in the Navy (17.6%). The high rate of use among health care workers is surprising and it may suggest that some personnel are using their jobs to obtain access to drugs.

A question arises as to why some of the occupational groups for enlisted personnel have higher rates of use than others. Higher rates may occur because of the characteristics of the job, which may indirectly encourage drug use (e.g., high perceived stress). Alternatively, they may occur because of the demographics of the personnel who are working in the group. That is, some occupational groups may comprise personnel who are at greater risk of drug use, such as men in junior enlisted pay grades. Indeed, this latter occurrence seems to explain the different drug use rates among occupational groups. Previously (in Section 5.6.3), we found that occupational groups did not have a significant effect in the regression models for enlisted males (both the demographic and psychological/behavioral models). This means that after we controlled for the other demographic and psychological differences among occupational groups for enlisted males, there was no longer a significant difference among groups in drug use rates that we observe in Table 5.6.

"Pressures of the job" is a reason that some people may give for using drugs. The relationship between any drug use and perceived stress at work for enlisted personnel, officers, and total DoD personnel is presented in Table 5.7. Enlisted personnel who perceived being under stress at work were more likely to also use drugs than those who did not perceive stress. We found that 9.7% of enlisted personnel who perceived a great deal of stress at work used drugs in the past month, 2.1% used marijuana only, and 7.6% used other drugs, compared to 3.1% who perceived that they were under little or no stress. The relationship was not as clear for officers. Drug use was almost nonexistent among officers who perceived little or no stress compared to 1.6% for those who perceived a great deal of stress. Drug use among officers in general was very low and only about 1% of those who

Table 5.6 Any Drug Use for Enlisted Personnel, Past 12 Months, by Occupation

Occupation	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Direct combat	11.2	(1.9)	+	(+)	14.2	(2.5)	3.8	(1.6)	10.9	(1.4)
Electronic equipment repair	7.9	(2.9)	4.9	(1.3)	+	(+)	0.8	(0.6)	4.3	(0.9)
Communications or intelligence	7.5	(2.6)	2.1	(0.5)	11.9	(1.6)	2.3	(1.5)	5.3	(1.0)
Health care	8.9	(2.2)	17.6	(4.3)	*	(*)	2.1	(1.1)	10.5	(2.3)
Other technical	+	(+)	+	(+)	+	(+)	3.2	(1.2)	7.6	(3.1)
Support & administration	6.6	(1.0)	4.2	(1.1)	9.0	(2.2)	2.8	(0.8)	5.0	(0.5)
Electrical/mechanical repair	8.8	(1.8)	7.9	(2.5)	+	(+)	3.5	(1.2)	7.4	(1.4)
Craftsman	0.7	(0.7)	+	(+)	**	(**)	1.3	(1.0)	7.8	(4.0)
Service and supply	10.2	(1.8)	0.5	(0.3)	11.2	(2.5)	5.3	(1.5)	6.6	(1.0)
Non-occupational	11.5	(3.4)	8.3	(4.2)	6.2	(3.0)	0.7	(0.7)	7.1	(2.1)
Total enlisted	9.0	(0.9)	7.4	(2.1)	11.9	(1.3)	2.8	(0.3)	7.1	(0.8)

Note: Table values are percentages (with standard errors in parentheses). Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*There are no health care workers in the Marine Corps.
**Estimate rounds to zero.
+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

perceived any level of job stress also used drugs. Those perceiving a great deal of stress were only slightly more likely than those perceiving no stress to use marijuana. The level of association between perceived stress and drug use was greater for the use of drugs other than marijuana. These drugs might have included tranquilizers and sedatives used without prescription.

5.8 Military and Civilian Comparisons

Compared to the general 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 those in the military and civilians. Table 5.8 contains standardized comparisons of drug use among military personnel and civilians during the past 30 days, with the civilian data drawn from the 1991 National Household Survey on Drug Abuse. Prevalence estimates for the individual Services are actual estimates for U.S.-based personnel. We have standardized the estimates for civilians to the 1992 U.S. DoD distribution by sex, age, education, race/ethnicity, and marital status.

Table 5.7 Perceived Stress Experienced at Work and Drug Use Pattern, Past 12 Months

Position/Perceived Stress Level at Work	Drug Use Pattern During Past 12 Months		
	Nonuser	Marijuana User Only	Other Drug User
Enlisted			
Great deal	90.3 (1.6)	2.1 (0.4)	7.6 (1.5)
Fairly large amount	91.1 (1.0)	2.6 (0.5)	6.3 (1.1)
Some	94.9 (0.8)	1.7 (0.4)	3.4 (0.6)
A little	95.6 (1.1)	0.8 (0.3)	3.6 (1.1)
None	97.0 (1.0)	1.2 (0.7)	1.9 (0.7)
Officer			
Great deal	98.3 (0.5)	0.4 (0.3)	1.2 (0.4)
Fairly large amount	98.7 (0.6)	0.0 (0.0)	1.3 (0.6)
Some	98.6 (0.5)	0.4 (0.3)	1.0 (0.4)
A little	99.9 (0.1)	0.0 (0.0)	0.1 (0.1)
None	100.0 (–)	0.0 (0.0)	0.0 (0.0)
Total			
Great deal	91.5 (1.4)	1.9 (0.4)	6.6 (1.3)
Fairly large amount	92.6 (0.8)	2.1 (0.4)	5.4 (0.9)
Some	95.5 (0.7)	1.5 (0.3)	3.0 (0.5)
A little	96.2 (0.9)	0.7 (0.3)	3.1 (0.9)
None	97.1 (0.9)	1.1 (0.6)	1.8 (0.7)

Note: Entries are row percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

The prevalence of drug use among military personnel in 1992 was less than half that of civilian personnel in 1991. We found that 3.4% of all military personnel aged 18-55 used illicit drugs in the previous month, which was significantly lower than the standardized estimate of 9.8% among civilians. Similarly, drug use for each of the Services was also significantly lower than use in the civilian population with similar sociodemographic characteristics. The prevalence of drug use in the Marine Corps, the Service with the highest rate, was still 40% below the civilian population comparable to the DoD as a whole. Even this sizable differential for the Marine Corps is conservative because we adjusted the civilian estimates to match the sociodemographic composition of DoD. As shown in Table 5.1, standardization of individual Services to the DoD sociodemographic distribution resulted in a sizable reduction in the estimate for the Marine Corps.

Differences were consistent for both males and females and across age groups (see Figure 5.7). All military groups had significantly lower rates of drug use than civilians. Differences between the military and civilian populations were more pronounced with

Table 5.8 Standardized Comparisons of the Prevalence of Any Illicit Drug Use[a] Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Age Group	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,977	N=10,210	N=3,098	N=2,320	N=1,634	N=3,158
18-25	15.4 (1.1)	6.9 (1.2)[b]	8.1 (2.2)[b]	7.9 (2.9)[b]	9.6 (1.9)[b]	1.5 (0.5)[b]
26-55	6.9 (0.4)	1.7 (0.3)[b]	2.2 (0.6)[b]	1.7 (0.7)[b]	1.1 (0.3)[b]	1.2 (0.4)[b]
All ages	10.1 (0.5)	3.6 (0.5)[b]	4.4 (1.1)[b]	4.1 (1.2)[b]	5.9 (1.4)[b]	1.3 (0.2)[b]
Females	N=12,176	N=1,265	N=317	N=390	N=80	N=478
18-25	12.2 (0.8)	2.7 (1.6)[b]	+ (+)	+ (+)	+ (+)	** (**)[b]
26-55	4.8 (0.5)	1.5 (0.5)[b]	2.2 (1.1)[b]	1.6 (0.8)[b]	** (**)	1.1 (0.8)[b]
All ages	8.3 (0.4)	2.1 (0.8)[b]	2.3 (1.1)[b]	2.7 (1.7)[b]	+ (+)	0.7 (0.5)[b]
Total	N=21,153	N=11,475	N=3,415	N=2,710	N=1,714	N=3,636
18-25	14.8 (0.9)	6.2 (1.2)[b]	7.3 (2.2)[b]	6.6 (2.7)[b]	9.6 (1.6)[b]	1.2 (0.4)[b]
26-55	6.7 (0.4)	1.6 (0.3)[b]	2.2 (0.5)[b]	1.7 (0.6)[b]	1.0 (0.3)[b]	1.2 (0.3)[b]
All ages	9.8 (0.4)	3.4 (0.5)[b]	4.1 (1.0)[b]	3.8 (1.1)[b]	5.9 (1.2)[b]	1.2 (0.2)[b]

Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the military data by 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). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

**Estimate rounds to zero.

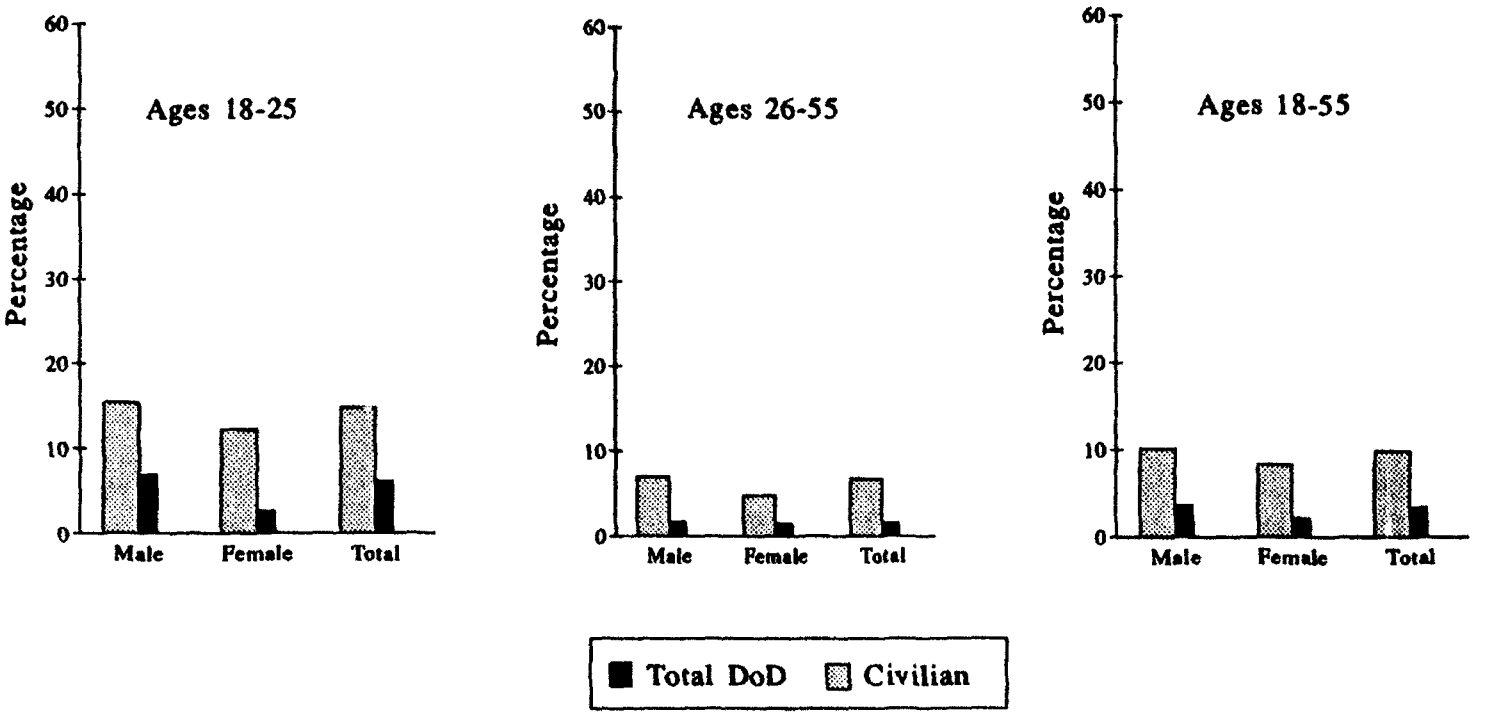
\+ Unreliable estimate.

[a]Nonmedical use one or more times of marijuana or hashish, inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, tranquilizers, analgesics, or "designer" drugs.

[b]Significantly different from civilian at the .05 level.

Civilian data source: National Household Survey on Drug Abuse, 1991.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 5.7 Standardized Comparisons of Any Illicit Drug Use Among Military Personnel and Civilians, Past 30 Days, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

females than with males, particularly with younger females. We estimated that 3.6% of U.S.-based males aged 18 to 55 used drugs in the past 30 days compared to 10.1% of civilian males. For females, 2.1% of those aged 18 to 55 in the military used drugs in the past month compared to 8.3% of civilians. With 18- to 25-year-old females, the estimate for the military was 2.7% compared to 12.2% of civilians.

5.9 Summary

Drug use has declined steadily during the 1980s and early 1990s for both military personnel and civilians, according to the results of a series of surveys. Among civilians, the use of most drugs began a downward trend after a peak in 1979. The Worldwide Survey series, which began in 1980, also has found a downward trend in drug use during the same period. Drug use among military personnel in 1992 was the lowest since the survey series began. The decline in drug use among military personnel reflects a broader societal trend of reduction in drug use as well as the effectiveness of military policies and programs directed toward reducing or eliminating drug use.

5.9.1 Trends in Illicit Drug Use

Illicit drug use among military personnel declined dramatically between 1980 and 1992, showing a significant decrease in the prevalence of drug use of over 85% in 12 years.

- Use of any illicit drugs decreased from 27.6% in the past 30 days in 1980 to 19.0% in 1982 to 8.9% in 1985 to 4.8% in 1988 and to 3.4% in 1992; we have seen similar decreases for use of marijuana and drugs other than marijuana (see Figure 5.1).

- All Services showed the same pattern of significant decreases from 1980 to 1992 observed for total DoD for illicit drug use in the past 30 days, with the Army declining from 30.7 to 3.9%; the Navy from 33.7 to 4.0%; the Marine Corps from 37.7 to 5.6%; and the Air Force from 14.5 to 1.2% (see Figure 5.1).

- The declines between the 1988 and 1992 surveys were statistically significant for the Army and Air Force, while no statistically significant change was observed for the Navy or the Marines. However, the Marine Corps data had an anomaly in that the trend line showed an apparent upturn. Although not a statistically significant shift, it is the first time since 1980 that the trend line for any of the Services has not maintained a downward pattern. Further exploration showed that the upturn was due to a statistically significant increase among junior enlisted personnel (E1-E3s).

- Change in the sociodemographic composition of the military population between 1980 and 1992 was not an important reason for the observed decreases in drug use over the period.

- Most drug use between 1985 and 1992 consisted of five drugs: marijuana, cocaine, hallucinogens, amphetamines, and analgesics, with marijuana being the drug most commonly used (see Figure 5.2).

5.9.2 Service Comparisons (Unadjusted and Adjusted)

Unadjusted and adjusted estimates of drug use for each of the Services are shown in Figure 5.3 and Table 5.1.

- Comparisons of unadjusted estimates showed that the rate of past year drug use was lowest among Air Force personnel (2.3%) than among personnel in the Army 7.7%, Navy, 6.6%, and Marine Corps (10.7%). The difference between the Air Force and each of the other Services was statistically significant.

- Adjusting rates for demographic differences by standardizing to the 1992 total DoD demographic composition raised the estimate of drug use for the Army and the Air Force, lowered the rate slightly for the Navy, and lowered the rate most notably for the Marine Corps, from 10.7% (unadjusted) to 7.1% (adjusted).

- For adjusted rates, Army, Navy, and Marine Corps drug use estimates were significantly higher than those for the Air Force.

5.9.3 Prevalence of Illicit Drug Use

Marijuana remained the drug used most commonly by military personnel, and use of other drugs was much lower, as shown in Table 5.2.

- In 1992, 1.5% of military personnel reported use of marijuana within the past month, 1.1% had used analgesics, and 30-day use of all other drugs was below 1%.

- There were indications that 30-day use of perception-altering substances may be on the increase, with LSD/hallucinogens up to 0.9% from 0.4% in 1988 and "designer drugs" at 0.3% compared to 0.2% in 1988.

- The Army and Navy showed similar drug use patterns, with marijuana being the most commonly used drug, followed by cocaine, hallucinogens, amphetamines, and analgesics. In contrast, the prevalence of the use of hallucinogens in the Marine Corps was higher than the prevalence of cocaine use. The Air Force showed use of marijuana and analgesics at roughly the same, but very low, levels (Table 5.2 and Figure 5.4).

- The use of any drug during the past 30 days and past 12 months was highest among the lower enlisted pay grades and declined monotonically across upper enlisted grades and officers. For the past 30 days, 9.2% of E1s to E3s and 2.7% of E4s to E6s reported drug use, compared to about 1% or lower of personnel in the other pay grades (see Figure 5.5).

- There was a striking difference in drug use in the lower pay grades between the Air Force and the other Services, with only 1.8% of Air Force E1 to E3 personnel using in the past month compared to over 10% for each of the other Services (see Figure 5.6).

5.9.4 Frequency of Drug Use

Most drug use among enlisted personnel during the past 30 days was infrequent (see Table 5.4).

- Use of drugs 1 to 3 times during the past 30 days was the most common use pattern for those enlisted personnel who had used drugs at least once in the previous month (2.4% of all enlisted personnel; 5.4% of E1-E3s). Frequent use, 11 or more times per month, was more common among E1-E3s than among the other pay grade groups (0.4% for both E4-E5s and E7-E9s).

5.9.5 Correlates of Illicit Drug Use

Illicit drug use was related to a number of sociodemographic, psychological, and behavioral factors (see Table D.12).

- Drug use among some groups varied by a factor of two or more. Males were nearly twice as likely to be users compared to females (6.7% versus 3.4%). Hispanics had the highest rate of use in the past year (8.9%), while blacks (4.2%) and those categorized as "other" (4.4%) had the lowest rates.

- Use varied across educational levels, with past-year use among those with a high school education or less (at approximately 10%) much higher than use among those who attended some college (5.5%) or were college graduates (1.9%).

- Those married with spouse present were much less likely to use drugs (3.6%) than those who were single (9.9%) or married with spouse not present (7.1%).

- After we controlled for the effects of other variables using regression analysis, we found that illicit drug use among enlisted males was strongly predicted by their inclination to use drugs in the absence of urinalysis testing, approval or disapproval of drug use by others in their social network, and attitudes about marijuana use. The following were also significant predictors of drug use among enlisted males: perceived stress at work, Service (i.e., drug use more likely in the Army and the Navy, relative to the Air Force), family status (i.e., more likely among single and married but unaccompanied personnel than among married and accompanied personnel), region (i.e., more likely in the Americas), and pay grade (i.e., more likely among E1-E3s).

5.9.6 Military Job and Illicit Drug Use

We examined rates of drug use among occupational groups and among those perceiving stress on the job.

- For military personnel, drug use was somewhat related to perceived stress at work during the past year, a relationship that was more evident among enlisted personnel. Nearly 10% of enlisted personnel who perceived a "great deal" of stress used drugs in the past year compared to 3.0% usage among those who perceived no job stress (see Table 5.7).

- For enlisted personnel, rates of use were highest for the occupations of direct combat (10.9%) and health care workers (10.5%) and lowest for electronic equipment repair (4.3%) (see Table 5.6). However, multivariate analyses showed that there was no significant effect for occupations after we adjusted for differences in sociodemographic characteristics among occupational groups.

5.9.7 Military and Civilian Comparisons

We standardized civilian data from the 1991 National Household Survey on Drug Abuse to the distribution of the military on age, sex, education, race/ethnicity, and marital status. We then compared military and civilian rates of use, as shown in Figure 5.7 and Table 5.8.

- Military personnel were significantly less likely than civilians to use any illicit drugs in the past 30 days (3.4% vs. 9.8%). This pattern held across all age groups and across all four Services.

- Differences between the military and civilian populations were consistent across males and females and across age groups. We estimated that 2.1% of U.S.-based females in the military used drugs in the past 30 days compared to 8.3% of civilian females. With males, the estimate for the military was 3.6%, compared to 10.1% of civilian males.

Taken together, these findings show dramatic declines in illicit drug use in the military during the past 12 years. Declining rates of use are at an all-time low and are not explained by changes in the demographic composition of the military. Rates of use are significantly lower in the military than among civilians. This demonstrates the continuing effectiveness of military efforts to eliminate illicit drug use among military personnel.

6. TOBACCO USE

Cigarette use among military personnel has shown a strong decline since 1980, when the first Worldwide Survey was conducted. Even so, tobacco use in 1992 remained common among military personnel. We presented a brief overview of the trends in cigarette use in the military in Chapter 3. In this chapter, we examine more extensively tobacco use among military personnel, including use of cigarettes, cigars, pipes, and smokeless tobacco. Following a review of prior relevant studies, we present information regarding prevalence and trends in tobacco use among the Services; correlates of smoking; reasons for smoking; the relationship between smoking and the military job, including the relationship between perceived job stress and smoking; and attempts to stop smoking. Where relevant, we also compare our findings with Healthy People 2000 objectives pertaining to smoking. Finally, we compare military and civilian data on the prevalence of smoking.

6.1 Prior Studies

The prevalence and correlates of tobacco use among civilians and military personnel have been examined in a series of surveys of both of these populations. These surveys document a decline in the prevalence of smoking since the release of the first report of the Surgeon General's Advisory Committee in 1964. However, the use of smokeless tobacco products has become an issue of concern, particularly among young males.

6.1.1 Civilian Populations

In 1964, when the Surgeon General's report on smoking and health was released, almost 45% of adults smoked cigarettes on a regular basis. By 1990, slightly more than one-fourth (25.5%) of the noninstitutionalized adult civilian population were identified as being current smokers (Morbidity and Mortality Weekly Report, 1992). Smoking rates for men decreased more rapidly than for women during this period, and the sex differential that was apparent in the 1960s decreased accordingly. In 1965, over 50% of men and about one-third of women smoked regularly. Twenty years later, in 1985, these percentages had declined to 33% and 28% (Morbidity and Mortality Weekly Report, 1986; NCHS, 1985, 1988). According to data from the 1990 National Health Interview Survey-Health Promotion Disease Prevention Supplement (NHIS-HPDP), an estimated 28.4% of adult males and 22.8% of adult females in 1990 were current smokers (defined in the NHIS-HPDP as having smoked at least 100 cigarettes lifetime and answering "yes" to the question, "Do you smoke cigarettes now?"; Morbidity and Mortality Weekly Report, 1992).

The 1990 National Household Survey on Drug Abuse (NHSDA) collected data on cigarette use by adolescents (i.e., 12- to 17-year-olds) as well as by adults in the household

population. With regard to age, the 1990 NHSDA rate of current smoking (defined in the NHSDA as having smoked in the past 30 days) was higher among the 26- to 34-year-old age group (37.5%) than among 18- to 25-year-olds or adults aged 35 and older (24.3%). However, for 18- to 21-year-olds, the prevalence of current smoking was 29.8%, as compared to a prevalence of 17.9% among 16- to 17-year-olds (NIDA, 1991a).

Trend data from the High School Senior Survey (Johnston, O'Malley, & Bachman, 1991) indicate that the prevalence of any cigarette smoking among high school seniors in the past 30 days declined from 39% in 1976 to 29% in 1981; since that time, the past-30-day prevalence has stayed around 29 to 30%. The prevalence of daily cigarette smoking (i.e., one or more cigarettes per day) in the past 30 days declined from 29% in 1977 to 20% in 1981. Since that time, however, there has been very little decline; the rate of daily use among high school seniors in the class of 1990 was 19%. Smoking of one-half pack of cigarettes or more per day in the past 30 days declined from 19% in 1977 to 11% from 1986 to 1990. The rates of any past-30-day cigarette use in 1990 were virtually identical for both male and female high school seniors (29.1% and 29.2%, respectively), but a slightly higher percentage of males (11.6%) reported smoking one-half pack or more of cigarettes per day than did females (10.8%).

Civilian consumption of smokeless tobacco products (snuff and chewing tobacco) increased rapidly in the early 1970s (Connolly et al., 1986). By 1985, the NHSDA indicated that 12.2% of men and less than 1% of women had used smokeless tobacco in the preceding year. The rate for those under age 26 was 11.1% (NIDA, 1988). In 1990, the prevalence of smokeless tobacco use in the past year was at 9.4% for males ages 12 and older and remained below 1% for females (NIDA, 1991a).

In particular, smokeless tobacco use has increased dramatically among young males. The Office on Smoking and Health (1989) reported that from 1970 to 1986, the prevalence of snuff use increased fifteenfold, and chewing tobacco use increased more than fourfold among young males ages 17 through 19. Findings from the 1990 NHSDA indicated that 18.5% of males in the 18 to 25 age group reported using smokeless tobacco in the past year (NIDA, 1991a).

6.1.2 Military Populations

Cigarette smoking declined among DoD personnel from 1980 to 1988. Specifically, the percentages of military personnel reporting current cigarette smoking declined from approximately 51% in 1980 and 1982 to 46.2% in 1985 and then to 40.9% in 1988 (Table 3.2). Rates of heavy smoking (one pack per day or more) also remained fairly constant from 1980 to 1982 and then declined significantly from 1982 to 1985 and from 1985 to 1988 (Bray et al., 1988). Concurrent with these declines, then-Secretary of Defense Caspar Weinberger issued a memorandum in March 1986 calling for an intensive

antismoking campaign, with instructions that the campaign be carried out at all levels of the DoD and each of the Services. Following the issuance of this memorandum, DoD and each of the Services produced detailed plans for preventing and reducing tobacco use (DoD, 1987). Although it is not possible from previous Worldwide Survey trend data alone to attribute these declines to the intensified antismoking efforts by DoD and the Services, these declines did come at a time when increased attention was being given to reducing the prevalence of smoking in the military.

Among the Services in 1988, the percentages of smokers were highest for Army and Navy personnel (43.1% and 43.8%, respectively), followed by Marine Corps personnel (41.3%), and Air Force personnel (35.8%). Unstandardized comparisons (i.e., not adjusted for differences in the sociodemographic composition of the Services) of the percentage of smokers between the Army and Air Force, the Navy and Air Force, and the Marine Corps and Air Force were all statistically significant. However, only the Army/Air Force and Navy/Air Force differences remained statistically significant after we controlled for differences in the sociodemographic composition of the Services, suggesting that the differences in smoking rates between the Marine Corps and Air Force may have been due in part to differences in sociodemographic composition (Bray et al., 1988).

Data on use of tobacco other than cigarettes have been available since 1985. In 1985, 25.7% of DoD personnel reported smoking a cigar or pipe during the past 12 months (Bray et al., 1986). A slightly smaller percentage of DoD personnel in 1988 smoked cigars or a pipe in the previous 12 months (24.0%). The prevalence of any smokeless tobacco use in the past year among all military personnel declined somewhat from 20.9% in 1985 to 17.3% in 1988 (Bray et al., 1988). However, readers should interpret with caution this apparent decline in smokeless tobacco use from 1985 to 1988, as these are unstandardized estimates; these estimates may therefore change if adjusted for any demographic differences between the two survey years.

6.1.3 Military and Civilian Comparisons

As indicated previously, because military and civilian populations differ in sociodemographic composition, valid comparison requires controlling for sociodemographic differences. Because the military population is predominantly young, unmarried, and male, unstandardized military rates would be expected to be substantially higher than civilian rates. In addition, the military population has a higher proportion of minorities than does the general population, so apparent differences between unstandardized military and civilian smoking rates could potentially be confounded by race as well.

Bray et al. (1991) compared military personnel living in the continental United States and civilians using the 1985 Worldwide Survey data and the 1985 NHSDA, which excluded active duty personnel living off base in civilian housing. After standardizing the

civilian data to the military by age, education, race/ethnicity, and sex, they found that the prevalence rates for both any smoking and heavy smoking were significantly higher among military personnel ($p<.001$). Analyses of smoking behavior among Navy personnel by Cronan and Conway (1988) suggested that part of the military/civilian difference was associated with the military environment. That is, many individuals began to smoke after entering the Navy; the Navy did not simply attract smokers. This finding was reinforced in a subsequent study in which Conway, Cronan, and Kaszas (1989) indicated that among recruits who were surveyed upon entering the Navy and one year later, the percentage of smokers increased from 27% upon entering the Service to 41% one year later. Of those who were former smokers on entry to the Navy, 54% had started smoking again a year later. Furthermore, there was a 12% increase in the number of new smokers from baseline to the 1-year mark. The authors noted that this increase was higher than would have been expected based upon current trends in the civilian population, particularly among young males.

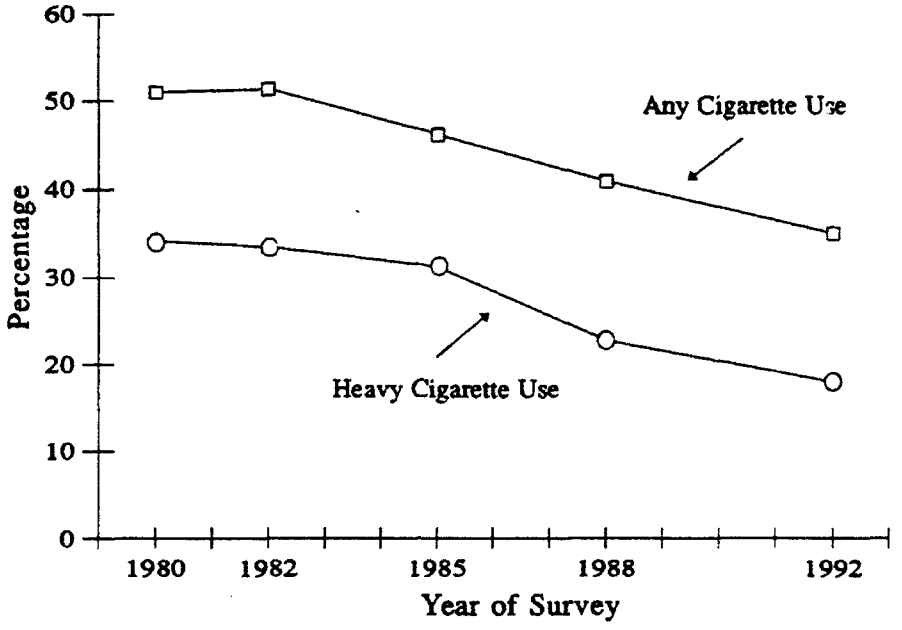
6.2 Trends in Cigarette Use

Chapter 3 provided an introductory overview of the trend in cigarette use in the military between 1980 and 1992. In this section, we also consider trends in heavy smoking for the total DoD and for each Service. We then focus on the most recent changes in smoking levels, based on comparisons between the 1988 and 1992 data.

Figure 6.1 (see also Table 3.1) 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 five Worldwide Surveys. The trends for both indicators between 1980 and 1992 are similar. During the 12-year period, any cigarette use declined significantly from 51.0% to 35.0%. Any cigarette use remained relatively constant from 1980 to 1982 and then showed significant declines from 1982 to 1985, from 1985 to 1988, and from 1988 to 1992. Heavy smoking also declined significantly, from 34.2% in 1980 to 18.0% in 1992. Like the rates for any cigarette use, heavy smoking did not change significantly between 1980 and 1982 but declined significantly between 1982 and 1985, 1985 and 1988, and 1988 and 1992. It is likely that these trends reflect, in part, societal trends in smoking described above as well as the increased emphasis on smoking cessation and prevention within the military.

Figure 6.2 presents trends for each of the Services from 1980 to 1992 for the prevalence of cigarette smoking during the 30 days prior to the survey (see also Tables D.1-D.4, D.18). The percentage of smokers in each of the Services was significantly lower in 1992 than in 1980. For the Army, Navy, and Air Force, cigarette smoking stayed fairly constant or increased slightly between 1980 and 1982 but then declined across subsequent survey years. For all three of these Services, cigarette smoking showed a significant

Figure 6.1 Trends in Any and Heavy Cigarette Use, Past 30 Days, Total DoD, 1980-1992



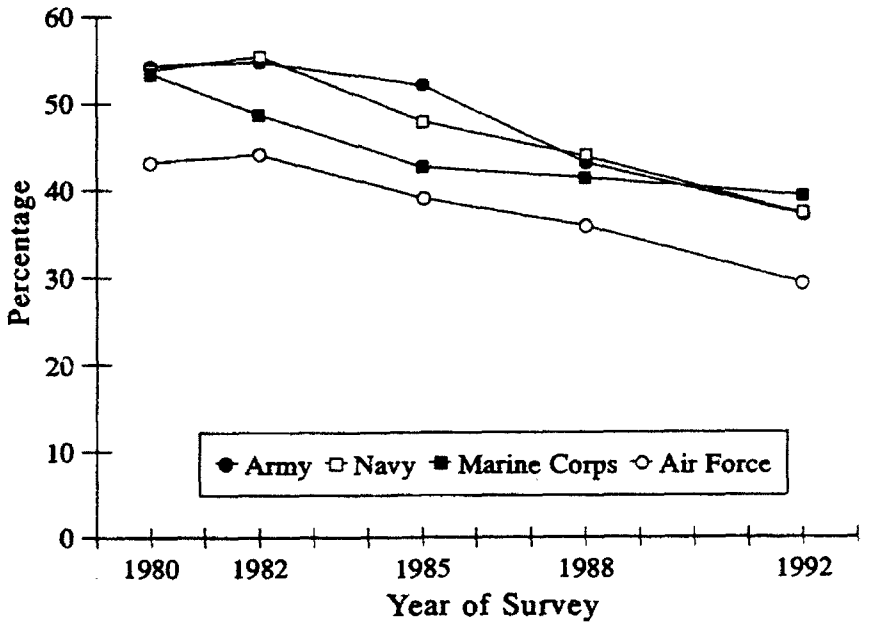
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

decrease from 1988 to 1992. Cigarette smoking also decreased significantly among Navy personnel between 1982 and 1985, and among Army personnel between 1985 and 1988. For the Marine Corps, cigarette smoking decreased significantly between 1980 and 1985. In the 7-year period from 1985 to 1992, the prevalence of cigarette smoking among Marine Corps personnel has held fairly steady at approximately 40%. Although the surveys show a slight downward trend from 1985 to 1992, the differences between consecutive survey years were not significant.

Figure 6.3 presents Service-specific trends in heavy smoking (see also Tables D.1-D.4, D.18). Each of the four Services followed the DoD pattern of a decline in heavy smoking from 1980 to 1992 (Figure 6.1). The Army and the Navy show very similar patterns across the entire survey series, with declines in heavy smokers between 1980 and 1992 of about 17 percentage points. The Marine Corps showed a slight but not statistically significant increase in heavy smoking from 18.7% in 1988 to 20.7% in 1992.

These findings also indicate progress that DoD and the Services are making with respect to selected Healthy People 2000 objectives pertaining to smoking. In particular, one of the Healthy People 2000 objectives is to reduce the prevalence of current cigarette smoking to no more than 20% of military personnel (PHS, 1991). Although smoking has

Figure 6.2 Trends in Any Cigarette Use, Past 30 Days, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

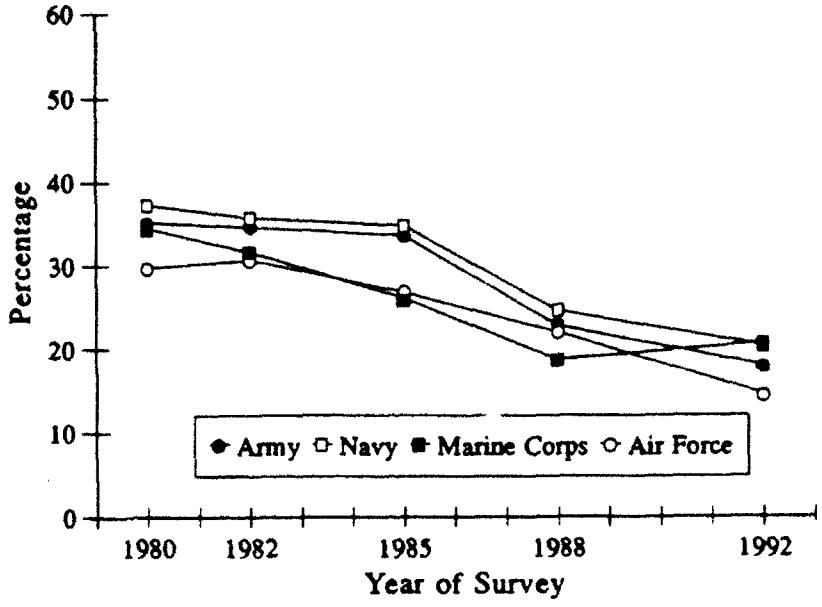
declined significantly since 1980, the rates of any smoking for DoD and the Services are all still above the 20% target rate (Tables D.1-D.4). The Air Force, with a prevalence of 29.2%, is closest to the 20% goal.

6.3 Service Comparisons of Cigarette Use

In this section, we provide two sets of estimates of the observed extent of cigarette use for each Service. We begin by presenting unadjusted estimates for each of the Services. These estimates, which indicate the observed prevalence rates of smoking in 1992, provide a perspective on the comparative magnitude of the challenge facing each Service in its efforts to eliminate smoking. These unadjusted estimates are descriptive only, however, and yield no explanatory information about differences among the Services.

As discussed in Section 2.7, one possible explanation for differences in the rates of cigarette use across the Services is differences in the sociodemographic composition of the Services. To address this possibility, we also provide adjusted estimates of the prevalence of smoking, using regression-based standardization procedures to control for sociodemographic differences. These constructed estimates resulting from standardization permit

Figure 6.3 Trends in Heavy Cigarette Use, Past 30 Days, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 1992. Unadjusted and adjusted estimates for both any smoking in the past 30 days and heavy smoking are shown in Table 6.1 and in Figures 6.4 and 6.5.

6.3.1 Unadjusted Estimates

Table 6.1 shows that the unadjusted rates for both any smoking and heavy smoking were significantly lower for the Air Force (29.2% and 14.6%, respectively) than for the other three Services. Unadjusted prevalence estimates of any smoking for the other three Services ranged from approximately 37% for the Army and the Navy to 39.2% for the Marine Corps, but the rate for the Marine Corps was not significantly different from the rates observed for the Army and Navy. For heavy smoking, unadjusted estimates for the Army, Navy, and Marine Corps ranged from 18.0% for the Army, to 20.4% for the Navy, and 20.7% for the Marine Corps. Again, the observed rates of heavy smoking for the Navy and Marine Corps were not significantly different from the rate for the Army.

Table 6.1 Estimates of Cigarette Use, Unadjusted and Adjusted for Sociodemographic Differences

Smoking Measure	Service			
	Army	Navy	Marine Corps	Air Force
Any Smoking				
Unadjusted	37.0 (2.0)[b]	37.1 (1.7)[b]	39.2 (2.3)[b]	29.2 (1.4)
Adjusted[a]	38.1 (1.5)[b]	35.6 (1.6)[b]	36.7 (1.5)[b]	31.1 (0.9)
Heavy Smoking				
Unadjusted	18.0 (1.1)[b]	20.4 (0.5)[b]	20.7 (1.8)[b]	14.6 (1.0)
Adjusted[a]	19.7 (1.2)[b]	19.3 (0.7)[b]	18.8 (1.3)[b]	14.7 (0.6)

Note: Entries are percentages (with standard errors in parentheses). Heavy smoking is defined as smoking one or more packs of cigarettes per day. Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps, etc.). Differences that were statistically significant are indicated.

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

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

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

These unadjusted estimates show the relative challenges that the Services face in discouraging smoking, particularly regarding the Healthy People 2000 goal of reducing the prevalence of any smoking among military personnel to no more than 20%. The Air Force faces the smallest challenge and is the closest to the 20% target, although still well above it. The magnitude of the challenge is relatively similar for the other three Services. However, these prevalence estimates do not provide any underlying explanations for the lower rates of any smoking and heavy smoking in the Air Force. Adjusting for differences in the sociodemographic composition of the Services may explain some of the differences between the Air Force and the other Services.

6.3.2 Adjusted Estimates

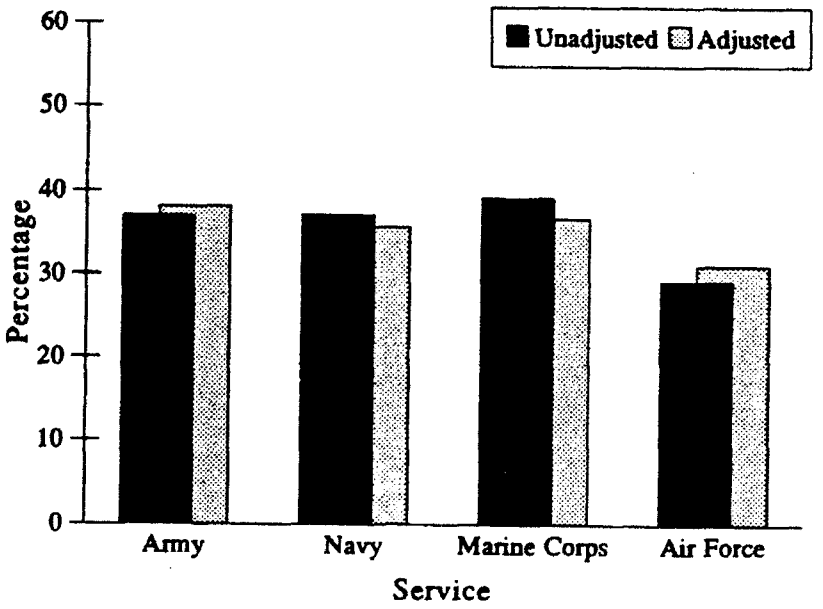
One possible explanation for the divergence of the Air Force from the other three Services is that the Air Force's sociodemographic composition is different from that of the other Services. Specifically, the Air Force was more likely than the other Services to have personnel who were older, better educated, and married.

To examine the possibility that differences in rates of any smoking and heavy smoking might have been due to sociodemographic differences among the Services, we developed adjusted prevalence estimates by standardizing the sociodemographic compositions of the Services to the sex, age, education, race/ethnicity, and marital status

distributions for the total DoD. These adjusted estimates are presented in Table 6.1 and contrasted graphically with the unadjusted estimates in Figures 6.4 and 6.5.

Adjusting for sociodemographic differences resulted in slightly lower estimates of any smoking and heavy smoking for the Navy and Marine Corps, and slightly higher estimates for the Army and the Air Force. However, the adjusted estimates of any smoking and heavy smoking remained significantly lower for the Air Force than the corresponding rates for the other Services. In addition, there were still no other significant differences in rates between any of the Services once we adjusted for sociodemographic differences. These findings suggest that the rates of any smoking and heavy smoking for the individual Services would be somewhat different if they had the same sociodemographic composition, but that sociodemographic differences play a fairly limited role in explaining differences among the Services. In particular, the rates of any smoking and heavy smoking for the Air Force remained significantly lower than the rates for the other Services even after we adjusted for sociodemographic differences. This finding indicates that the significantly lower unadjusted rates for the Air Force were due primarily to factors other than sociodemographic differences between the Air Force and

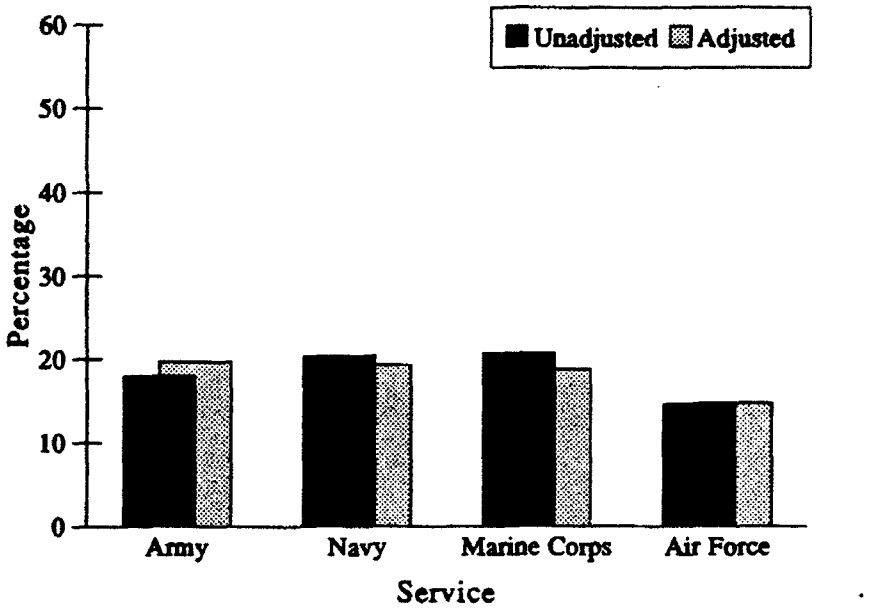
Figure 6.4 Estimates of Any Cigarette Use, Unadjusted and Adjusted for Sociodemographic Differences



Note: Adjusted estimates have been standardized by sex, age, education, race/ethnicity, and marital status to the total DoD distribution.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 6.5 Estimates of Heavy Smoking, Unadjusted and Adjusted for Sociodemographic Differences



Note: Adjusted estimates have been standardized by sex, age, education, race/ethnicity, and marital status to the total DoD distribution.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

the other Services. It also suggests that differences in smoking rates might be explained in part by environmental or programmatic differences between the Air Force and the other Services. Alternatively, there may be other differences in the characteristics of personnel who join the Air Force, compared to those who join the other Services. For example, individuals who join the Air Force may be less predisposed to become smokers or more predisposed to quit.

6.4 Other Tobacco Use

The 1992 survey confirmed that cigarette use was by far the most pervasive form of tobacco use in the military, but that military personnel also used other forms of tobacco. Knowing the extent of tobacco use other than cigarette use and understanding the relationship between cigarette use and other tobacco use is necessary to develop comprehensive policies and programs for prevention and cessation of tobacco use. In this section, we examine data related to these aspects of tobacco use.

6.4.1 Prevalence of Cigar, Pipe, and Smokeless Tobacco Use

Table 6.2 presents the prevalence of cigar, pipe, and smokeless tobacco use for the total DoD and for each of the Services. As shown, 17.1% of all military personnel, or approximately 1 in every 6, smoked cigars or a pipe. This rate was down from the 24.0% reported in 1988 (Bray et al., 1988). Smokeless tobacco was used by 17.4% of military personnel, indicating no change since 1988 (Bray et al., 1988). Again, however, readers should interpret with caution any apparent trends, as these estimates have not been adjusted to reflect any changes in the sociodemographic composition of the military that may have taken place since 1988.

Use of cigars or a pipe continued to be infrequent (less than once per week for most users). For smokeless tobacco, however, it appears that personnel used these products either infrequently (i.e., less than once a week; 8.0% of total DoD) or almost daily (7.0% of total DoD).

In Figure 6.6, we present the prevalence of other tobacco use by Service. Marines used cigars and pipes more frequently (27.9%) than the other Services (14.0% to 18.0%) and smokeless tobacco (36.0%) more frequently than the other Services (11.5% to 19.1%). In addition to overall highest prevalence of smokeless tobacco use, Table 6.2 shows that Marine Corps personnel also had distinctively higher rates of smokeless tobacco use 5 or more days/week (16.3%) than did the other Services (4.6% to 7.7%). However, over half (57.2%) of all the personnel in the Marine Corps are aged 25 or younger, compared with 38.1% of Army personnel, 43.2% of the Navy, and only 29.4% of the Air Force; and the Marine Corps has a higher proportion of males than do the other Services (Table 2.4). Therefore, differences

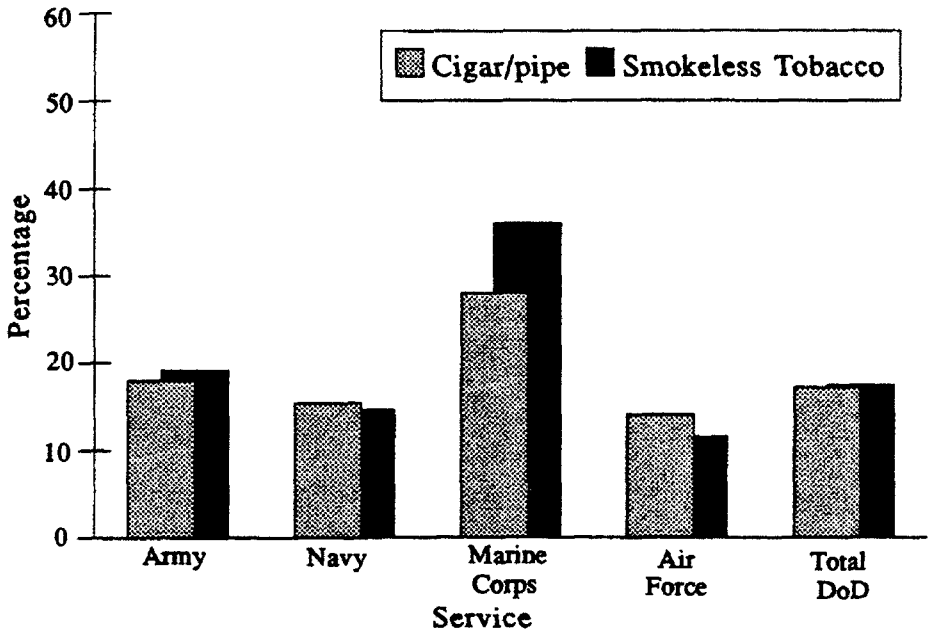
Table 6.2 Prevalence of Cigar, Pipe, and Smokeless Tobacco Use, Past 12 Months

	Service									
Tobacco/Frequency	Army		Navy		Marine Corps		Air Force		Total DoD	
Cigars/Pipe										
Didn't smoke	82.1	(1.4)	84.7	(0.9)	72.1	(1.0)	86.0	(0.8)	82.9	(0.6)
Less than once/week	14.6	(1.4)	12.3	(0.9)	24.0	(0.8)	11.7	(0.9)	14.1	(0.6)
1-4 days/week	0.9	(0.1)	0.5	(0.2)	1.4	(0.5)	1.0	(0.2)	0.8	(0.1)
5 or more days/week	2.5	(0.3)	2.5	(0.5)	2.5	(0.8)	1.3	(0.2)	2.2	(0.2)
Smokeless Tobacco										
Didn't use	80.9	(1.9)	85.5	(2.0)	64.0	(2.3)	88.5	(1.5)	82.6	(1.0)
Less than once/week	9.3	(1.0)	6.4	(0.8)	16.2	(1.7)	5.3	(0.7)	8.0	(0.5)
1-4 days/week	2.1	(0.4)	3.0	(0.9)	3.5	(0.4)	1.6	(0.3)	2.4	(0.3)
5 or more days/week	7.7	(0.8)	5.1	(0.8)	16.3	(1.2)	4.6	(0.8)	7.0	(0.4)

Note: Entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 6.6 Prevalence of Other Tobacco Use, Past 12 Months, by Service, 1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

between the Marine Corps and the other Services may in part reflect these differences in demographics.

We next present findings on the prevalence of smokeless tobacco use among males aged 24 or younger to permit us to compare Worldwide Survey data with Healthy People 2000 objectives on reduction of smokeless tobacco use. We first describe the survey findings, then discuss them relative to the Healthy People 2000 objectives. As shown in Table 6.3, young men aged 24 or younger in the military used smokeless tobacco during the past year at a much higher rate than the DoD average. For the total DoD, 32.5% of young males aged 24 or younger used smokeless tobacco, compared with 17.4% for the total military population. The Air Force and Navy had similar rates of smokeless tobacco use among males in this age group (25.5% and 27.9%, respectively), followed by the Army, with a smokeless tobacco use rate of 32.1%. The highest prevalence of smokeless tobacco use among males aged 24 or younger was in the Marine Corps, with nearly half (47.4%) having used smokeless tobacco in the past year.

The prevalence of smokeless tobacco use on an almost daily basis (i.e., 5 or more days/week, on average) for males aged 24 or younger was 12.2% for the total DoD and 10 to 11% for the Army, Navy, and Air Force. Nearly one in five young male Marines (19.8%) used smokeless tobacco 5 or more days/week. Thus, even after we controlled for age and sex, the rates of

Table 6.3 Prevalence of Smokeless Tobacco Use, Past 12 Months, for Males Ages 24 and Younger

Frequency	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Didn't use	67.9 (2.2)	72.1 (3.7)	52.6 (1.2)	74.5 (2.5)	67.5 (1.3)
Less than once/week	17.4 (1.7)	10.7 (1.8)	23.5 (1.2)	11.2 (1.9)	15.4 (1.0)
1-4 days/week	4.3 (1.0)	6.4 (2.9)	4.1 (0.8)	4.6 (0.6)	4.9 (1.0)
5 or more days/week	10.4 (1.3)	10.8 (2.2)	19.8 (1.4)	9.7 (1.8)	12.2 (0.9)
Total prevalence	32.1 (2.2)	27.9 (3.7)	47.4 (1.2)	25.5 (2.5)	32.5 (1.3)

Note: Entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

smokeless tobacco use remained higher in the Marine Corps, compared with the total DoD and the other three Services.

The related Healthy People 2000 objective is to reduce current smokeless tobacco use by males aged 24 and under to a prevalence of no more than 4%, with "current" users being defined as persons who have used smokeless tobacco on 20 or more occasions in their lifetimes and who have used smokeless tobacco in the past month (PHS, 1991). Although the 1992 Worldwide Survey did not include direct measures of lifetime smokeless tobacco use or of smokeless tobacco use in the past month, we believe it is reasonable to infer that military personnel who reported using smokeless tobacco on an average of at least once a week in the past year are likely to meet the definition of a "current" user. If that is the case, then these prevalence estimates for DoD and all four Services were still well above the 4% prevalence objective, with 17.1% of young males in the total DoD, 14.7% in the Army, 17.2% in the Navy, 23.9% in the Marine Corps, and 14.3% in the Air Force having used smokeless tobacco on average at least once a week in the past year. Although this Healthy People 2000 objective for the general population includes males who are under age 18, these high rates of smokeless tobacco use among young males in the military, and particularly in the Marine Corps, are clearly a cause for concern. Furthermore, the prevalence of past-year smokeless tobacco use among young males aged 18 to 24 in the military (32.5% for the total DoD) was considerably higher than the 18.5% reported by the 1990 NHSDA for males in the 18- to 25-year-old age group (NIDA, 1991a).

6.4.2 Other Tobacco Use and Cigarette Smoking

Table 6.4 shows the relationship of other tobacco use to cigarette smoking in 1992. The data in the right-hand column of this table provide information about the percentage of military personnel who had never smoked (38.6%), were former smokers

Table 6.4 Relationship of Other Tobacco Use to Cigarette Smoking

Grade/Cigarette Smoking Level[b]	Other Tobacco Use[a]		
	Cigars/Pipe	Smokeless Tobacco	Total
Enlisted			
Never smoked	3.5 (0.4)	7.9 (0.7)	36.3 (0.6)
Former smoker	15.5 (1.1)	19.6 (1.3)	24.6 (0.9)
Smoke <1 pack/day	29.7 (1.6)	27.9 (2.1)	18.8 (0.6)
Smoke ≥1 pack/day	33.1 (1.4)	27.0 (2.0)	20.3 (0.5)
Total	17.4 (0.6)	18.4 (1.0)	100.0 (--)
Officer			
Never smoked	7.2 (0.8)	6.5 (0.8)	50.4 (1.5)
Former smoker	21.8 (1.5)	15.4 (1.8)	36.8 (1.4)
Smoke <1 pack/day	37.7 (5.8)	24.8 (4.2)	6.8 (0.7)
Smoke ≥1 pack/day	19.4 (4.1)	12.3 (3.5)	6.0 (0.6)
Total	15.4 (0.9)	11.4 (1.1)	100.0 (--)
Total DoD			
Never smoked	4.3 (0.4)	7.6 (0.5)	38.6 (0.6)
Former smoker	16.9 (1.0)	18.7 (1.3)	26.5 (0.9)
Smoke <1 pack/day	30.2 (1.6)	27.7 (2.0)	16.9 (0.6)
Smoke ≥1 pack/day	32.4 (1.4)	26.3 (2.1)	18.0 (0.5)
Total	17.1 (0.6)	17.3 (1.0)	100.0 (--)

Note: Table values are percentages (with standard errors in parentheses). Entries show those at the cigarette smoking level who also smoke cigars/pipes or use smokeless tobacco.

[a]Data on other tobacco use refer to the past 12 months.

[b]Data on cigarette smoking levels refer to the past 30 days.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

(26.5%), or were currently light smokers (16.9%) or heavy smokers (18.0%). Larger percentages of officers than enlisted personnel were former smokers or had never smoked. In contrast, percentages in both categories of current smokers were larger for enlisted personnel than for officers.

Table 6.4 also shows significantly larger percentages of enlisted personnel than officers as having used smokeless tobacco. Among enlisted personnel, 18.4% used smokeless tobacco in the past year compared to 11.4% of officers.

Among enlisted personnel, we saw a clear relationship between cigarette smoking and the use of other tobacco products. Use of other tobacco products was lowest among those who had never smoked, followed by those who were former smokers. Within the enlisted group, current smokers showed the highest rates of other tobacco use; we observed similar rates of other tobacco use for both light and heavy smokers.

Officers who had never been cigarette smokers were also less likely to have used other tobacco products in the past year, compared to officers who were former or current smokers. Among officers who were current smokers, however, the highest use of both types of other tobacco products occurred among those who smoked less than a pack of cigarettes per day.

6.5 Correlates of Smoking

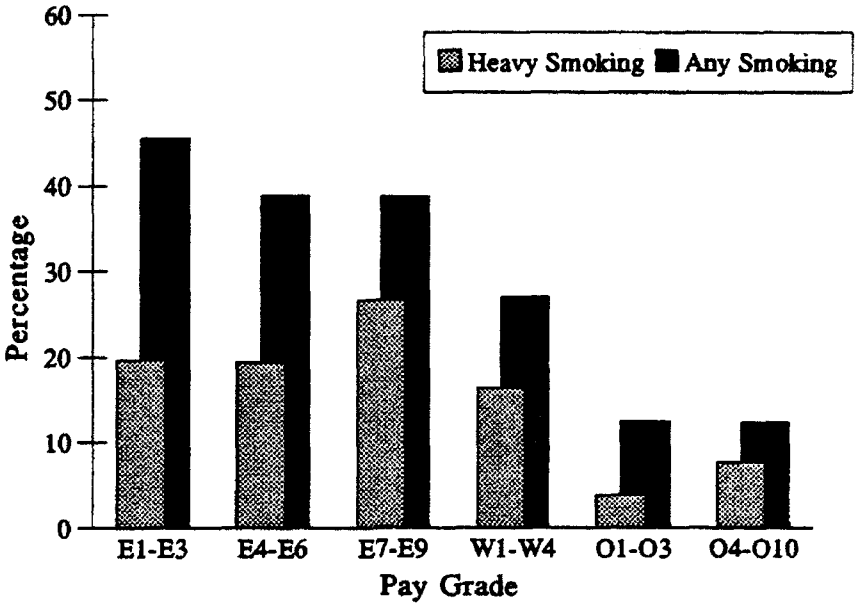
For the military to develop sound policies and programs that meet the needs of the military organization and individual persons within the military, planners will require knowledge of characteristics of tobacco users. In this section we examine the sociodemographic correlates of cigarette smoking. First, we examine the relationship of individual characteristics and smoking. Then, we present the results of our multivariate regression analyses of any smoking and heavy smoking.

6.5.1 Descriptive Findings

In previous chapters, we have noted substantial variation among pay grades in alcohol and drug use, with those in the lower pay grades showing greater use. Figure 6.7 and Table D.19 (Appendix D) present information about cigarette smoking by pay grade. For the total DoD, the prevalence of any smoking was substantially higher among enlisted personnel (38.0% to 43.4%) than among officers (11.8% among the O1-O3 pay grade group and 12.3% among the O4-O10 pay grade group).

There was also a larger percentage of heavy smokers among enlisted personnel than among officers. For heavy smoking, there is also a clear pattern for the percentage of heavy smokers to be greater in the higher pay grades within both the enlisted and officer ranks. Senior enlisted personnel, E7-E9s, were significantly more likely to smoke heavily (26.6%) than E1-E3s (19.6%) or E4-E6s (19.4%). Similarly, officers in the O4-O10 pay grades were more likely to smoke heavily (7.6%) than were officers in the O1-O3 pay grades (3.8%). The percentages of warrant officers who smoked at all (26.8%) or who smoked heavily (16.4%) fell between the corresponding rates for enlisted personnel and officers. The finding that heavy smokers were more likely to be found in the higher pay grade groups for both enlisted personnel and officers may reflect societal trends toward reduced smoking. That is, although the prevalence of <u>any</u> smoking was highest among personnel in the E1-E3 pay grade group (43.4%; Figure 6.5 and Table D.19), who also tend to be the youngest personnel, they were less likely to be heavy smokers than were the more senior, and presumably older, personnel. To the extent that these junior enlisted personnel have not been smoking as long as older personnel, these findings may suggest that younger smokers in the military have responded to some of the societal trends toward reduced smoking by not smoking as heavily. Unfortunately, however, these personnel have not heeded the most important aspect of antismoking messages and campaigns, which is not to smoke at all.

Figure 6.7 Cigarette Use, Past 30 Days, by Pay Grade, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Although there were a few exceptions, these DoD patterns for smoking for pay grades tended to hold true for each of the Services. Comparing the Services, Air Force enlisted personnel had lower percentages of smokers than the other Services, while Navy officers had fewer smokers than the other Services.

Tables D.20 and D.21 present cigarette use by selected sociodemographic characteristics. Although past research on civilians has shown that males are more likely to smoke than females, such differences have not appeared in the military. We found no significant difference between the percentages of males (35.7%) and females (31.5%) who smoked in 1992. Cigarette smoking was negatively related to level of education and pay grade. Unlike the situation in 1988, when the presence of a spouse was related to a lower likelihood of smoking (Bray et al., 1988), we found little relationship in 1992 between smoking and family status. All of these patterns of association between sociodemographic characteristics and smoking that we observed for the total DoD, we also saw (with few exceptions) for the four individual Services.

We also examined cigarette use by pay grade for personnel stationed within each of the different regions (i.e., the Americas, North Pacific, Other Pacific, and Europe). The

results are presented in Table D.21. Within each Service and across the different pay grade groups, rates of smoking were generally comparable from region to region. In the North Pacific, however, the prevalence of smoking among Air Force officers in the O4-O10 pay grade group was higher than among O4-O10s in the other Services.

6.5.2 Multivariate Findings

The relationships we observed between each of the individual characteristics mentioned in the previous section and smoking may be misleading, because many of these characteristics are themselves related (e.g., age, pay grade, education, marital status). We needed a multivariate framework to assess the independent effects of these factors. Therefore, we conducted logistic regression analyses to examine the independent contribution of each of the demographic characteristics when we considered them simultaneously.

For these analyses, we created a dichotomous (0,1) smoking variable. Smokers were coded as 1, and nonsmokers were coded as 0. The logistic regression analyses estimated the odds of being a smoker. Demographic, behavioral, and psychosocial variables were modeled in the analyses, with the indexes for the latter two described in Appendix F.

In the remainder of this section, we discuss only the results of the full models that include demographic, behavioral, and psychosocial variables. However, the results for the models with demographic variables alone are comparable to those for the full models. We have included detailed results for both the demographic and full models in Appendix F.

Enlisted Males. Statistically significant ($p < .05$) odds ratios generated from the full regression models for enlisted males are summarized in Table 6.5. (In this case, odds ratios are the ratios of the probabilities of any smoking between the two groups being compared, with all other factors held constant.) For enlisted males, the odds of being a smoker were significantly higher--after we adjusted for all other variables in the analysis--among:

- enlisted males in the Army than enlisted males in the Air Force;
- whites than among all other racial and ethnic groups;
- enlisted males with a high school education or less, than those with more than a high school education;
- E1-E3s and E4-E6s than E7-E9s;
- older enlisted males than younger enlisted males;

Table 6.5 Significant Odds Ratios for Predicting Any Smoking Among Enlisted Males

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Army vs. Air Force	1.50***	1.28	1.75
Race/Ethnicity			
Black vs. white	0.61***	0.50	0.75
Hispanic vs. white	0.64***	0.50	0.83
Other vs. white	0.75*	0.59	0.96
Education			
High school or less vs. beyond high school	1.42***	1.22	1.65
Pay Grade			
E1-E3 vs. E7-E9	1.85***	1.53	2.24
E4-E6 vs. E7-E9	1.25**	1.10	1.44
Occupation			
Electronic equipment repair vs. direct combat	0.74*	0.55	0.99
Communications and intelligence vs. direct combat	0.67**	0.53	0.86
Health care vs. direct combat	0.57**	0.39	0.85
Other technical vs. direct combat	0.71*	0.53	0.95
Age	1.03***	1.02	1.04
Perceived Stress at Work			
High vs. low	2.39***	1.74	3.28
Moderate vs. low	1.72***	1.28	2.34
Health Practices	0.79***	0.72	0.87

Note: Odds ratios are from the logistic regression model including demographic, behavioral, and psychosocial variables (see Appendix F). Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*$p < .05$.

**$p < .01$.

***$p < .001$.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

- enlisted males under high and moderate levels of perceived work-related stress than those under low levels of perceived stress; and
- enlisted males engaging in fewer health practices than those engaging in more.

In particular, the relationship between perceived work-related stress and smoking was highly significant, with enlisted males who reported being under high levels of work-related stress 2.39 times more likely to be smokers than were enlisted males who perceived little or no stress at work. In addition, the odds of being a smoker were 85% higher among male E1-E3s than among males in the E7-E9 category. Among enlisted males in the Army, the odds of being a smoker were 50% higher than for enlisted males in the Air Force, and among enlisted males with a high school education or less, the odds of being a smoker were 42% higher than for those with more than a high school education.

Occupational category was also a significant predictor of cigarette smoking among enlisted males. Males in the electronic equipment repair, communications and intelligence, health care, and other technical occupational categories were significantly less likely than direct combat personnel to be smokers.

Enlisted Females. The odds ratios of smoking for enlisted females appear in Table 6.6. Among enlisted females, as was the case for enlisted males, the following were all significant predictors of any smoking:

- Service,
- race/ethnicity,
- education,
- occupation (i.e., functional support personnel were more likely to be smokers than were service and supply personnel),
- age, and
- health practices.

However, it was enlisted females in the Marine Corps rather than in the Army who were more likely to be smokers, relative to the Air Force, with enlisted females being nearly three times more likely to be smokers than were enlisted females in the Air Force. In addition, single enlisted females were significantly more likely to be smokers than were married, accompanied enlisted females. In contrast, the likelihood among enlisted males of being a smoker was almost the same regardless of whether they were single, married but unaccompanied, or married and accompanied (Table F.5). However, perceived high and moderate levels of work-related stress, which were both significant predictors of

Table 6.6 Significant Odds Ratios for Predicting Any Smoking Among Enlisted Females

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Marine Corps vs. Air Force	2.70**	1.40	5.23
Race/Ethnicity			
Black vs. white	0.27***	0.21	0.36
Hispanic vs. white	0.47*	0.24	0.94
Education			
High school or less vs. beyond high school	1.69**	1.25	2.29
Family Status			
Single vs. married, spouse present	1.31*	1.02	1.68
Occupation			
Functional support vs. service and supply	1.78*	1.07	2.96
Age	1.06***	1.03	1.08
Health Practices	0.80**	0.71	0.91

Note: Odds ratios are from the logistic regression model including demographic, behavioral, and psychosocial variables (see Appendix F). Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*$p < .05$.

**$p < .01$.

***$p < .001$.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

smoking among enlisted males, were not significant predictors of smoking among enlisted females (Table F.6).

Officers. Among officers (Table 6.7), Service (more likely among officers in the Navy), education, pay grade, and health practices were also significant predictors of smoking. Unlike the models for both male and female enlisted personnel, however, region was a significant predictor of smoking among officers. Officers stationed in Europe had the highest odds of smoking and those stationed in the Americas had the lowest odds, with the odds of smoking among officers in the Americas being 31% lower than the odds for officers in Europe. In addition, race/ethnicity was not a significant predictor of smoking among officers but was for both enlisted males and enlisted females.

To summarize, educational level and the number of health practices were significant predictors of smoking, regardless of whether personnel were enlisted males, enlisted females, or officers. Thus, the negative relationship that we described in Section 6.5.1 between education and smoking remained after we controlled for the effects of other

Table 6.7 Significant Odds Ratios for Predicting Any Smoking Among Officers

Item/Comparison	Odds Ratio	95% CI* Lower Limit	95% CI Upper Limit
Service			
Navy vs. Air Force	1.41*	1.01	1.96
Education			
High school or less vs. beyond high school	2.52*	1.08	5.86
Region			
Americas vs. Europe	0.69**	0.54	0.89
Pay Grade			
W1-W4 vs. O4-O10	2.46***	1.72	3.50
Health Practices	0.69***	0.59	0.82

Note: Odds ratios are from the logistic regression model including demographic, behavioral, and psychosocial variables (see Appendix F).

*$p < .05$.

**$p < .01$.

***$p < .001$.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

variables. This finding suggests that the prevalence of smoking in the military may naturally decline as the overall educational level in the military increases.

However, the relationship between smoking and pay grade that we described in Section 6.5.1 held only for enlisted males and officers, but not for enlisted females, after we controlled for other variables. Furthermore, for enlisted males there was a strong relationship between perceived work-related stress and smoking, but this relationship did not hold for enlisted females or officers. This latter finding suggests that interventions designed to reduce levels of perceived work-related stress or to assist personnel in coping with stress could have an impact on smoking among enlisted males, particularly if these interventions were targeted toward personnel in the lower pay grade groups.

Finally, with regard to these multivariate analyses, personnel who served in Operation Desert Shield/Desert Storm were no more likely to be current smokers than were personnel who did not serve in the Operation, after we controlled for the effects of other variables (Tables F.5 through F.7). We observed no relationship regardless of whether personnel were enlisted males, enlisted females, or officers. Furthermore, there was no significant relationship between service in Desert Shield/Desert Storm and smoking even for the demographic models that did not include levels of perceived stress. We discuss the implications of these results further in Chapter 12.

6.6 Reasons for Smoking

Reasons that cigarette smokers gave for smoking can provide important guidance to military policymakers and health care providers as they develop policies and interventions designed to (a) discourage military personnel from beginning to smoke and (b) encourage current smokers to quit. For example, reasons that "new" smokers (i.e., those who had smoked regularly for a year or less) gave for smoking could help policymakers develop interventions to address psychosocial factors that might lead a person to start smoking.

Findings on reasons for smoking, according to the length of time that personnel had been smoking, are presented in Table 6.8 for the total DoD. Among personnel who had been smoking for a year or less, 38.4% smoked to help them relax. Other important reasons this group gave for smoking were to satisfy a craving (33.9%), and to help them handle stress (29.6%). Among personnel who had been smoking for more than 5 years, smoking to satisfy a craving was also a common reason for smoking, but a higher percentage of these long-term smokers (57.9%) smoked to satisfy a craving, compared to those individuals who had just recently started to smoke. Furthermore, the percentage who smoked to satisfy a craving increased with length of time smoking. Personnel who had been smoking for 2 or more years also were more likely to smoke "for the enjoyment

Table 6.8 Reasons for Smoking Cigarettes, by Length of Time Smoking, Total DoD

Reason	Length of Time			
	1 Year or Less	2-5 Years	>5 Years	Total
To fit in with the group	5.2 (3.3)	3.3 (1.0)	1.6 (0.3)	2.3 (0.5)
To help me relax	38.4 (5.4)	45.6 (1.9)	40.4 (1.4)	41.5 (1.4)
To keep my weight down	5.7 (3.3)	10.0 (2.4)	12.3 (0.8)	11.2 (1.0)
To show that I'm "cool"	+ (+)	1.2 (0.5)	0.8 (0.3)	1.2 (0.3)
To show that I'm tough	+ (+)	0.9 (0.5)	0.5 (0.2)	0.9 (0.3)
To look and feel like an adult	+ (+)	0.9 (0.5)	0.7 (0.2)	0.9 (0.3)
To help me when I'm bored	18.3 (4.1)	24.8 (3.0)	18.2 (1.1)	19.8 (0.8)
To help me concentrate	10.9 (4.0)	10.4 (2.0)	10.0 (1.0)	10.2 (0.8)
To satisfy a craving	33.9 (4.8)	45.9 (2.1)	57.9 (1.3)	53.2 (1.1)
To help me handle stress	29.6 (5.8)	38.7 (1.7)	35.2 (1.3)	35.6 (1.1)
For the taste	21.6 (4.8)	23.8 (2.3)	30.4 (1.7)	28.1 (1.7)
For the enjoyment of it	26.8 (3.9)	41.6 (3.6)	44.5 (1.4)	42.5 (1.3)

Note: Entries are percentages (with standard errors in parentheses). Data are percentages of current cigarette smokers who reported that a particular reason was "Very Important" or "Fairly Important" for their smoking.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

of it" (41.6% and 44.5%), compared with those who had been smoking for a year or less (26.8%).

These findings suggest that military personnel may begin to smoke primarily as a mechanism to cope with stress. Although similar percentages of personnel smoked to relax, to help them handle stress, and to help alleviate boredom, regardless of the length of time that they had been smoking, longer-term smokers were more likely than newer smokers to smoke out of a need to satisfy a craving or to smoke for the enjoyment of it. A sizable percentage of personnel who had been smoking for a year or less also smoked to satisfy a craving, indicating that they had probably begun to be addicted to nicotine, but it appears that smoking to satisfy a craving and smoking out of enjoyment become more

important motivations for smoking once the habit is more firmly established. One possible implication of these findings with regard to policies and programs designed to discourage smoking in the military is that planners may need to continue their efforts to encourage both smokers and nonsmokers to use more healthy ways to cope with stress as alternatives to smoking.

6.7 Military Job and Smoking

Findings pertaining to cigarette use among different military occupational groups are shown in Table 6.9. Among enlisted personnel in the total DoD, the prevalence of current smoking was highest among craftsmen (51.7%), direct combat personnel (45.6%), and electrical/mechanical repair personnel (43.8%), compared to a prevalence of 39.2% for all enlisted personnel in the total DoD. Among all officers in the military, the prevalence of current smoking was 13.0% and was fairly uniform across the different occupational groups, although the rates for the scientist/professional and health care officers were somewhat lower than for the others. Rates of current smoking by occupational group within each of the individual Services were highly variable, and we found no evidence of a clear relationship between smoking and occupation at the Service level, because of the large number of occupational categories, and small sample sizes within some categories.

As we indicated previously (Table 6.8), common reasons that smokers gave for their smoking were to help them relax or to reduce stress that they may have been feeling. In addition, the multivariate analyses shown in Tables 6.5 through 6.7 indicate that perceived work-related stress levels were significant predictors of smoking for enlisted males. In Table 6.10 we address this issue further by investigating the relationship between perceived job stress and cigarette smoking. Overall, results show that the percentage of personnel who were heavy smokers was higher for those who felt they were under more stress. Among those reporting that they perceived no stress, 10.5% smoked one or more packs of cigarettes per day compared with those who perceived a "great deal" of stress, of whom 25.2% smoked heavily.

This pattern for the total DoD holds both among enlisted personnel and officers. For enlisted personnel, heavy smoking ranged from 11.0% for those perceiving no stress to 28.6% for those perceiving a "great deal" of stress. For officers, although rates of heavy smoking were lower when compared with rates for enlisted personnel, the relationship between perceived level of stress and heavy smoking was particularly dramatic. Slightly less than 7% of officers perceiving that they were under a "great deal" of stress were heavy smokers, but less than 0.5% of the officers perceiving no stress were heavy smokers. These relationships are illustrated in Figure 6.8.

Table 6.9 Cigarette Use, by Occupation

Pay Grade/Occupation	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Enlisted										
Direct combat	45.3	(2.5)	60.3	(7.2)	44.5	(3.9)	34.2	(3.1)	45.6	(2.1)
Electronic equipment repair	44.2	(4.7)	32.6	(2.8)	44.0	(7.9)	37.0	(2.3)	36.3	(1.7)
Communications & intelligence	32.0	(3.9)	33.1	(3.7)	39.0	(4.7)	26.9	(2.6)	32.3	(2.0)
Health care	30.4	(5.7)	33.4	(4.9)	*	(*)	34.1	(4.3)	32.4	(3.1)
Other technical	47.5	(6.8)	28.7	(7.2)	+	(+)	26.3	(3.2)	33.3	(3.1)
Support & administration	40.6	(2.7)	35.9	(4.0)	36.2	(3.0)	33.1	(3.2)	36.5	(1.7)
Electrical/mechanical repair	49.2	(4.5)	43.3	(2.7)	+	(+)	37.9	(1.6)	43.8	(1.8)
Craftsman	36.5	(6.1)	60.4	(4.8)	+	(+)	36.9	(5.4)	[illegible]	(4.7)
Service and supply	39.1	(2.7)	31.9	(3.8)	35.9	(4.4)	40.2	(1.9)	37.2	(1.5)
Non-occupational	49.6	(4.0)	39.7	(3.9)	32.5	(3.3)	31.2	(2.9)	39.6	(2.2)
Total enlisted	42.0	(1.6)	40.1	(1.5)	42.0	(2.2)	34.0	(1.0)	39.2	(0.8)
Officer										
General officer or executive	+	(+)	16.4	(4.1)	35.6	(3.5)	5.9	(3.1)	17.8	(3.5)
Tactical operations	17.0	(3.4)	19.7	(5.0)	11.4	(3.4)	10.8	(3.0)	14.7	(2.0)
Intelligence	+	(+)	+	(+)	8.2	(2.8)	8.4	(3.3)	12.1	(3.0)
Engineering/maintenance	17.2	(2.5)	14.9	(3.5)	15.6	(5.1)	8.0	(3.4)	13.0	(2.0)
Scientist/professional	8.9	(2.6)	+	(+)	+	(+)	8.7	(2.6)	8.9	(1.8)
Health care	8.1	(1.9)	13.2	(2.4)	*	(*)	9.4	(3.4)	9.6	(1.6)
Administrator	11.2	(3.6)	5.6	(1.2)	15.1	(4.7)	15.5	(4.5)	11.9	(2.2)
Supply/procurement	17.4	(6.5)	13.6	(4.2)	+	(+)	9.6	(3.2)	15.5	(3.0)
Non-occupational	+	(+)	+	(+)	+	(+)	+	(+)	14.1	(4.4)
Total officer	14.6	(1.3)	14.8	(1.1)	16.4	(2.8)	9.5	(1.0)	13.0	(0.7)

Note: Table values are column percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*There are no health care personnel in the Marine Corps.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 6.10 Perceived Stress Experienced at Work, Past 12 Months, and Cigarette Use

Grade/Stress Level at Work	Smoking Level		
	Nonsmoker	Less Than 1 Pack/Day	1 or More Packs/Day
Enlisted			
Great deal	52.4 (1.5)	18.9 (1.4)	28.6 (1.5)
Fairly large amount	58.6 (1.2)	19.6 (1.1)	21.8 (1.0)
Some	64.4 (1.3)	17.9 (1.0)	17.8 (0.8)
A little	68.7 (1.5)	20.3 (1.3)	11.0 (0.8)
None	74.2 (3.4)	14.8 (3.1)	11.0 (1.9)
Officer			
Great deal	86.9 (1.5)	6.2 (1.2)	6.9 (1.1)
Fairly large amount	85.7 (1.4)	7.5 (1.1)	6.8 (1.3)
Some	87.5 (1.3)	6.8 (1.1)	5.8 (0.9)
A little	89.4 (2.4)	6.7 (2.4)	3.9 (1.5)
None	93.7 (3.6)	5.9 (3.5)	0.4 (0.4)
Total DoD			
Great deal	57.8 (1.7)	17.0 (1.3)	25.2 (1.4)
Fairly large amount	63.7 (1.1)	17.4 (1.0)	19.0 (0.8)
Some	68.2 (1.2)	16.0 (0.9)	15.8 (0.7)
A little	71.5 (1.5)	18.5 (1.2)	10.1 (0.8)
None	75.2 (3.3)	14.3 (3.0)	10.5 (1.8)

Note: Entries are row percentages (with standard errors in parentheses).

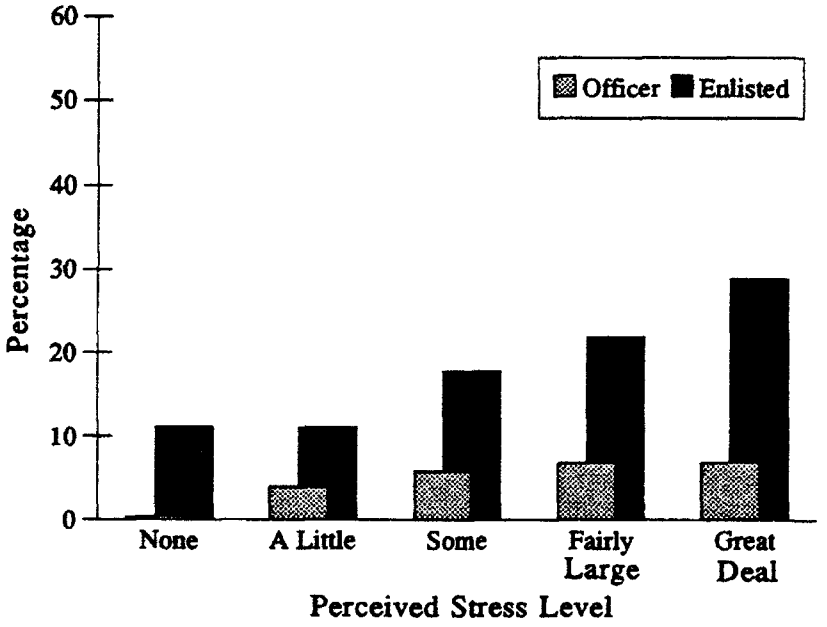
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

6.8 Attempts to Stop Smoking

Information regarding attempts to stop smoking provides valuable insight 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 6.11 presents our findings on respondents' attempts to stop smoking cigarettes during the past year. As shown in the top panel, a large percentage (39.1%) of military personnel never smoked. In the total DoD, a substantial number of personnel (25.8%) successfully stopped smoking, 20.4% over a year ago and 5.4% within the past year. An additional 15.9% made a serious but unsuccessful attempt to quit smoking within the past year, whereas 19.1% did not try to quit within this period. Among the four Services, a slightly higher proportion of Marine Corps personnel successfully quit

Figure 6.8 Heavy Cigarette Smoking, by Level of Perceived Stress, Past 12 Months, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

smoking in the past year (8.0%), compared to the other Services, and a slightly higher proportion of Marine Corps personnel attempted to quit smoking in the past year (20.4%), although they were not successful. This group of current smokers throughout the military who tried to quit may be some of the most promising personnel for efforts to further reduce smoking in the military.

The lower half of Table 6.11 shows smokers' attempts to stop smoking cigarettes during the past year. ("Smokers" are the bottom three groups in the top panel of the table.) For the total DoD, 13.4% of these smokers quit within the past year, 39.3% tried to quit but continued smoking, and 47.2% did not try to quit. Overall, then, over half (52.7%) of the military personnel who were smokers in the past year made an attempt to quit during the past year. Of those who tried to quit, approximately one out of four were successful. The pattern of quit attempts among past-year smokers in each Service is similar to that for the entire DoD. These data suggest considerable interest in cessation of smoking and a relatively large potential audience for programs designed to help military personnel stop smoking. However, the 47.2% of smokers in the military who did not try to quit during the past year may represent a more formidable target for policies and programs designed to reduce or eliminate smoking.

Table 6.11 Serious Attempt to Stop Smoking Cigarettes During the Past Year

Group/Status	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Among All Personnel					
Never smoked	39.2 (1.3)	37.6 (1.2)	36.1 (1.3)	41.7 (1.1)	39.1 (0.6)
Former smoker, quit over a year ago	19.0 (1.3)	20.1 (2.0)	16.3 (2.9)	23.7 (1.3)	20.4 (0.9)
Former smoker, quit within past year	4.8 (0.5)	5.0 (1.0)	8.0 (0.8)	5.6 (0.4)	5.4 (0.4)
Current smoker, tried to quit	16.8 (1.4)	14.9 (1.1)	20.4 (1.8)	14.4 (0.9)	15.9 (0.7)
Current smoker, didn't try to quit	20.2 (1.2)	22.4 (3.1)	19.2 (1.2)	14.5 (0.9)	19.1 (1.1)
Among Smokers, Past Year					
Former smoker, quit within past year	11.5 (1.4)	11.8 (2.5)	16.9 (2.0)	16.3 (1.1)	13.4 (1.0)
Current smoker, tried to quit	40.1 (2.2)	35.2 (3.8)	42.8 (2.0)	41.8 (1.6)	39.3 (1.6)
Current smoker, didn't try to quit	48.3 (2.1)	53.0 (5.7)	40.3 (2.3)	41.9 (1.8)	47.2 (2.2)

Note: Entries are column percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

6.9 Military and Civilian Comparisons of Smoking

As indicated elsewhere in this chapter (e.g., Sections 6.1 and 6.2), cigarette smoking has declined over time in both the military and civilian populations. However, in a previous comparison of smoking rates in the military and civilian populations, Bray, Marsden, and Peterson (1991) found that the prevalence rates of any smoking and heavy smoking in 1985 were still significantly higher among military personnel stationed in the continental U.S. (CONUS) than among civilians, after the researchers had standardized the civilian data to the military. In this section, we describe comparisons of the prevalence of any smoking that we made between civilian data taken from the 1991 National Household Survey on Drug Abuse (NHSDA), and data from the 1992 Worldwide Survey for military personnel who were stationed in the U.S. (including Alaska and Hawaii).

Results of the comparison of the prevalence of current smoking for the civilian and U.S.-based military populations are shown in Tables 6.12 and 6.13. As stated previously, we standardized the civilian data to the demographic distribution of the U.S.-based military population by sex, age, education, race/ethnicity, and marital status. Details about the standardization procedures are in Appendix F.

Table 6.12 and Figure 6.9 present data on the prevalence of any smoking within different age groups, and among males, females, and the total population, for the civilian and the U.S.-based military populations. U.S.-based population estimates for the individual Services are also shown in Table 6.12. As in 1985, the prevalence of any smoking was significantly greater among all U.S.-based military personnel in 1992 who were between the ages of 18 and 55 (34.3%) than it was among all persons in the same age group in the 1991 U.S. household population (30.4%). In addition, the prevalence of smoking in the military was significantly greater than among civilians for all age groups. In 1985, however, the prevalence of smoking was significantly greater among 18- to 25-year olds in the military than it was in the corresponding civilian comparison groups, but there was no significant difference between the military and civilian rates among 26- to 55-year-olds (Bray, Marsden, & Peterson, 1991).

In 1992, the prevalence of any smoking was also significantly greater among males in the military in all age groups than it was in the 1991 civilian population. In 1985, however, the prevalence of smoking among males in the military was significantly greater than the prevalence for the civilian comparison group only among males in the 18 to 25 age group (Bray, Marsden, & Peterson, 1991). Findings for the individual Services followed the pattern for DoD, although not all comparisons were significantly different. In particular, there were no significant differences in smoking rates between Air Force personnel and civilians.

Table 6.12 Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Age Group	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,977	N=10,201	N=3,097	N=2,312	N=1,635	N=3,157
18-25	33.3 (1.7)	38.3 (1.6)[a]	39.1 (2.4)	40.2 (2.8)[a]	41.5 (4.1)	31.5 (2.5)
26-55	29.4 (1.0)	32.9 (1.3)[a]	36.3 (2.9)[a]	35.4 (2.5)[a]	36.3 (3.4)	26.2 (1.7)
All ages	30.8 (1.0)	34.9 (1.2)[a]	37.3 (2.6)[a]	37.2 (2.3)[a]	39.2 (2.9)[a]	27.7 (1.6)
Females	N=12,176	N=1,262	N=317	N=389	N=80	N=476
18-25	29.3 (1.2)	31.6 (3.0)	30.9 (5.3)	32.7 (4.5)	+ (+)	25.3 (4.4)
26-55	27.3 (1.1)	30.4 (2.1)	29.1 (4.7)	36.6 (2.7)[a]	+ (+)	23.9 (3.3)
All ages	28.2 (0.8)	31.0 (2.1)	29.8 (4.6)	34.3 (2.9)[a]	+ (+)	24.5 (2.5)
Total	N=21,153	N=11,463	N=3,414	N=2,701	N=1,715	N=3,633
18-25	32.6 (1.4)	37.1 (1.4)[a]	38.0 (2.5)	38.1 (2.3)[a]	42.1(3.7)[a]	30.3 (2.2)
26-55	29.1 (0.9)	32.6 (1.2)[a]	35.5 (2.8)[a]	35.5 (2.1)[a]	36.3(3.4)[a]	25.9 (1.6)
All ages	30.4 (0.9)	34.3 (1.2)[a]	36.4 (2.5)[a]	36.6 (2.0)[a]	39.6(2.7)[a]	27.2 (1.4)

Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the military data by sex, 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). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

[a]Significantly different from civilian at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 6.13 Standardized Comparisons of Cigarette Smoking Levels Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Cigarette Use	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,884	N=10,182	N=3,088	N=2,307	N=1,631	N=3,156
Nonsmoker	69.6 (1.0)	65.3 (1.2)*	62.9 (2.6)*	63.1 (2.1)*	61.0 (2.8)*	72.3 (1.6)
< 1 pack/day	13.7 (0.7)	18.6 (0.7)*	19.1 (1.5)*	20.1 (1.0)*	21.8 (2.1)*	15.0 (1.2)
≥ 1 pack/day	16.6 (0.7)	16.1 (0.7)	18.0 (1.9)	16.7 (1.3)	17.2 (1.0)	12.6 (0.8)*
Females	N=12,073	N=1,261	N=316	N=389	N=80	N=476
Nonsmoker	72.4 (0.9)	69.0 (2.1)	70.2 (4.6)	65.7 (2.9)*	+ (+)	75.5 (2.5)
< 1 pack/day	15.6 (0.7)	13.5 (1.4)	9.3 (1.9)*	18.4 (1.6)	+ (+)	7.5 (2.1)*
≥ 1 pack/day	12.1 (0.7)	17.5 (1.2)*	20.4 (3.5)*	15.9 (1.9)	+ (+)	16.9 (2.0)*
Total	N=20,957	N=11,443	N=3,404	N=2,696	N=1,711	N=3,632
Nonsmoker	70.0 (0.9)	65.8 (1.1)*	63.8 (2.5)*	63.7 (1.9)*	60.6 (2.6)*	72.8 (1.4)
< 1 pack/day	14.0 (0.6)	17.9 (0.6)*	17.9 (1.3)*	19.8 (0.7)*	22.0 (1.9)*	14.0 (1.2)
≥ 1 pack/day	16.0 (0.6)	16.3 (0.7)	18.3 (1.8)	16.6 (1.3)	17.4 (1.0)	13.2 (0.7)*

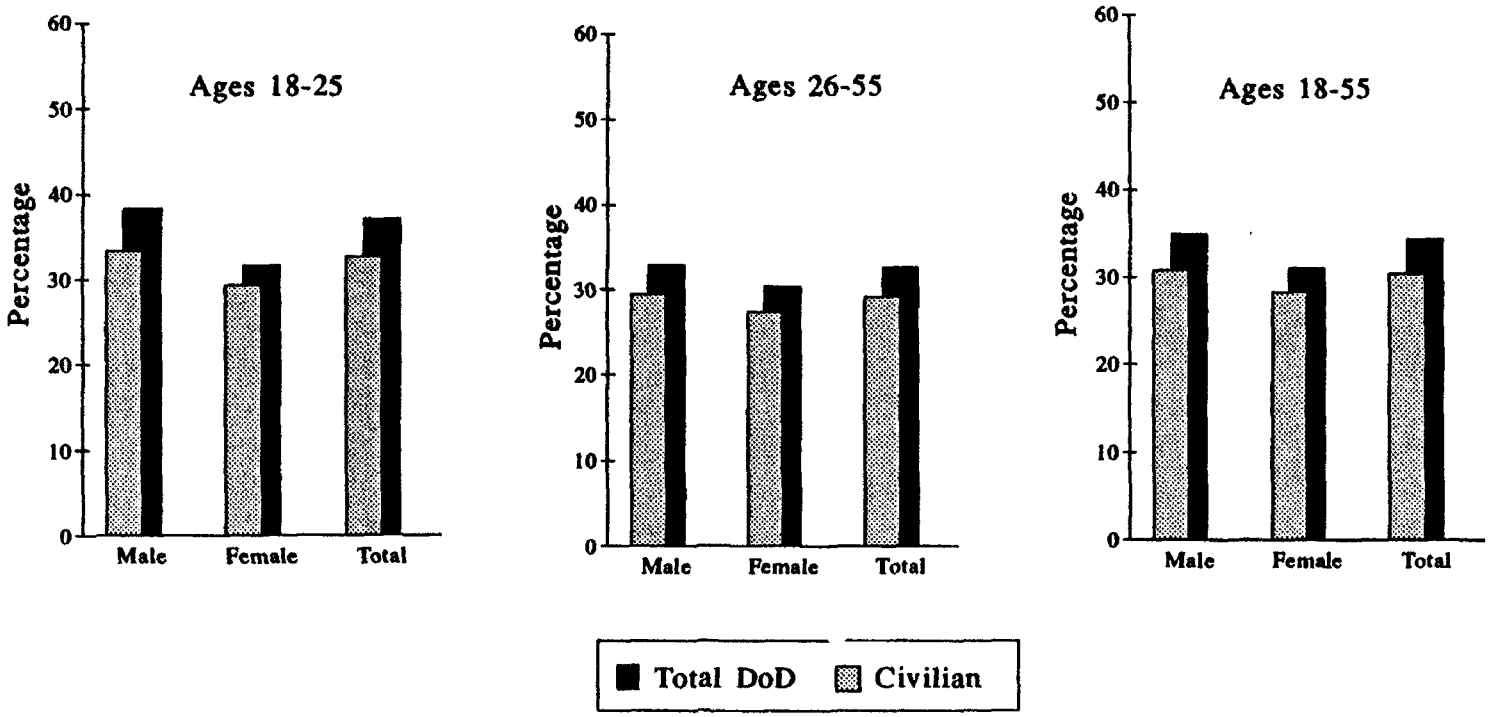
Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

*Significantly different from civilian at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 6.9 Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

These findings indicate that although the military has made considerable progress in reducing smoking among its personnel since the Worldwide Survey series began in 1980, U.S.-based military personnel overall and males in the military are still significantly more likely to smoke than are their civilian counterparts.

However, one encouraging finding from these comparisons was that the prevalence rates of smoking among females in the U.S.-based total DoD overall and in all age groups were comparable to the rates among females in the civilian population. In contrast, in 1985, the prevalence of smoking and among females in the military was significantly higher than among females in the civilian population, regardless of age (Bray, Marsden, & Peterson 1991).

Table 6.13 presents findings on the prevalence rates of different smoking levels among U.S.-based military personnel and civilians ages 18 to 55. In addition, military/civilian comparisons of the rates of heavy smoking are shown in Figure 6.10. With regard to heavy smoking (i.e., one pack or more per day), there were no significant differences between the overall military and civilian populations, or between males in the military and civilian populations. However, females in the U.S.-based total DoD were significantly more likely to be heavy smokers than were their civilian counterparts. In comparison, the rates of heavy smoking in 1985 among all military personnel and among both males and females in the military were all significantly higher than those among their civilian counterparts (Bray, Marsden, & Peterson, 1991).

As shown in Table 6.13, the higher rates of any smoking in the total military population and among males in the military described previously were due to higher rates of these personnel smoking less than a pack of cigarettes per day, but not to higher rates of heavy smoking. This finding is consistent with that of the significant declines in heavy smoking in the military that we discussed in Section 6.2.

Comparisons of rates of heavy smoking for civilians and for the Services generally followed the pattern observed for DoD. However, there was a notable exception for the Air Force. Overall, Air Force personnel showed lower rates of heavy smoking (13.2%) than their civilian counterparts (16.0%). Air Force males showed this same pattern, but Air Force females showed the opposite pattern of a significantly higher rate than civilians (16.9% vs. 12.1%). Nevertheless, the former data are encouraging since this is an instance of a military smoking rate being significantly lower than the corresponding rate for civilians.

To summarize, then, military personnel overall and military men continued to show significantly higher rates of any smoking than their civilian counterparts, but comparable rates (i.e., no significant difference) of heavy smoking. In contrast, the prevalence of <u>any</u> smoking among females in the military was not significantly different

Figure 6.10 **Standardized Comparisons of Heavy Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, by Sex**

Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

from that in the civilian population, but the prevalence of heavy smoking was significantly higher among military women than among civilian women.

6.10 Summary

This chapter has described tobacco use among military personnel. It has focused primarily on the most prevalent form of tobacco use, cigarette smoking and its correlates.

6.10.1 Trends in Cigarette Use

Prior studies among civilians and military personnel show a decline in the prevalence of cigarette smoking. This trend is supported by findings of the 1992 Worldwide Survey, which show smoking levels at their lowest since the Worldwide Survey series began in 1980 (see Figures 6.1 and 6.2, and Table 3.1).

- The prevalence of any cigarette smoking declined from 51.0% in 1980 to 35.0% in 1992. For all four Services, the prevalence of any

cigarette smoking in 1992 was also significantly lower relative to the start of the Worldwide Survey series in 1980. For the Army, Navy, and Air Force, the prevalence of any smoking was also significantly lower than it was in 1988.

- The prevalence of heavy cigarette smoking (one or more packs per day) also showed a significant decline from 34.2% in 1980 to 18.0% in 1992. We observed similar overall trends in the decline in heavy smoking relative to 1980 for the Services. As for the prevalence of any smoking, rates of heavy smoking were all significantly lower in the Army, Navy, and Air Force than they were in 1988.

- Despite the continued decline in smoking, the rates of any smoking in the total DoD and in all four Services were all still well above the 20% target for military personnel set for Healthy People 2000.

6.10.2 Service Comparisons of Cigarette Use

We made comparisons of unadjusted (i.e., observed) estimates as well as estimates that had been adjusted to take into account sociodemographic differences between the Services. Comparison of adjusted estimates allowed us to test whether we could attribute Service differences in any cigarette use and heavy cigarette use to variations in sociodemographic composition of the Services (see Figures 6.4 and 6.5 and Table 6.1).

- Adjusting for sociodemographic differences raised the estimates of any smoking and heavy smoking slightly for the Army and Air Force and lowered them somewhat for the Navy and Marine Corps.

- Adjusted estimates of any smoking and heavy smoking remained significantly lower for the Air Force, compared to the other Services.

- 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 relatively limited role in explaining Service differences in smoking.

6.10.3 Cigarette Use and Other Tobacco Use

Planners and policymakers must understand the relationship between cigarette use and other tobacco use before they can develop comprehensive policies and programs for smoking prevention and cessation (see Tables 6.2 through 6.4, and Figure 6.6).

- An estimated 17% of military personnel smoked cigars or a pipe in 1992, a decrease from 24% in 1988. Approximately the same proportion used smokeless tobacco, indicating no change since 1988. Use of cigars or pipes continued to be infrequent (less than

once per week for most users), but personnel who used smokeless tobacco products used them either infrequently or almost daily.

- Rates of use for other tobacco products were substantially higher among the Marine Corps (28% cigars/pipe; 36% smokeless tobacco) than for the other Services (14-18% cigars/pipe; 12-20% smokeless tobacco).

- The prevalence of smokeless tobacco use among men aged 24 and younger (33%) was considerably higher than the 17% observed for the total DoD. Between 1 in 4 and 1 in 3 young men in the Army, Navy, and Air Force used smokeless tobacco products in the past year. Nearly half of the young men in the Marine Corps used smokeless tobacco in the past year.

- Considerable effort is needed to achieve the Healthy People 2000 objective of 4% current smokeless tobacco use among males aged 24 and younger.

- Significantly larger percentages of enlisted personnel than officers smoked cigars or pipes (17.4% vs. 15.4%) or used smokeless tobacco (18.4% vs. 11.4%).

6.10.4 Correlates of Smoking

Development of sound policies and programs regarding smoking requires knowledge of characteristics of tobacco users.

- In the military, there was no significant difference between the percentage of males (35.7%) and females (31.5%) who were current smokers (Table D.20).

- Cigarette smoking was negatively related to education, with 44.2% of personnel with a high school education being smokers, compared to only 14.9% of personnel with a college degree or higher (Table D.20).

- For the total DoD and the Services, both any smoking and heavy smoking were substantially higher among enlisted personnel than among officers. The rate of any smoking was highest among E1-E3s (Figure 6.7 and Table D.19)

- However, rates of heavy smoking were higher among personnel in higher pay grades within both enlisted and officer ranks. Among enlisted personnel, 26.6% of E7-E9s were heavy smokers compared with 19.6% of E1-E3s (Table D.19). Among officers, 7.6% of O4-O10s were heavy smokers compared with 3.8% of O1-O3s.

- In logistic regression analyses, education and health practices were significant predictors of any smoking among enlisted males, enlisted females, and officers (Tables 6.5 through 6.7). Specifically, the lower the educational level or the fewer health practices that personnel engaged in, the more likely they were to be smokers.

- Pay grade was a significant predictor of smoking among enlisted males and officers but not among enlisted females, after we had controlled for the effects of other variables.

- Perceived work-related stress was a highly significant predictor of smoking for enlisted males, but not for enlisted females or officers.

6.10.5 Reasons for Smoking

- Common reasons that smokers in the military gave for their smoking were to satisfy a craving, to help them relax, and to help them handle stress, regardless of the length of time that they had been smoking (see Table 6.8).

- Personnel who had been smoking for longer periods of time were more likely to smoke for the enjoyment of it and to satisfy a craving than were personnel who had been smoking for a year or less.

6.10.6 Military Job and Smoking

- Among enlisted personnel, cigarette smoking was more prevalent within the craftsman (51.7%), combat (45.6%), and electrical/mechanical repair (43.8%) occupational groups (see Table 6.9). Among officers, personnel who were in the scientist/professional (8.9%) and health care groups (9.6%) were somewhat less likely to be smokers than were officers in other occupational groups.

- When we used logistic regression analyses to control for the effects of other variables, enlisted males in the electronic equipment repair, communications and intelligence, health care, and other technical occupations were less likely to be smokers than enlisted males in direct combat-related occupations; and enlisted females in functional support occupations were less likely to be smokers than enlisted females in service and supply roles (see Tables F.5 through F.7).

- Heavy smoking was more likely among those who perceived that they were under a "great deal" of stress at work (25.2%) than among those who reported no stress (10.5%). (See Table 6.10.)

6.10.7 Attempts to Stop Smoking

- In the total DoD, 25.8% of all personnel successfully stopped smoking, with 5.4% having quit in the past year (Table 6.11). Overall, 21.3% of all military personnel were current or former smokers who had tried to quit in the past year; 15.9% made a serious, but unsuccessful, attempt to quit. Overall, nearly 40% of military personnel never smoked.

- During the past year among those who smoked, 52.7% made an attempt to quit smoking. However, only 13.4% of the personnel who were smokers in the past year successfully quit, or approximately 1 out of every 4 smokers who attempted to quit in the past year.

6.10.8 Military and Civilian Comparisons

Comparisons of prevalence rates of any smoking and heavy smoking between military and civilian populations in 1985 indicated that both rates were significantly higher among military personnel (Bray, Marsden, & Peterson, 1991). Using the 1992 Worldwide Survey data, we again compared rates of any smoking and heavy smoking among the military and civilian populations, after we had adjusted the civilian data to reflect the demographic characteristics of the military population (see Tables 6.12 and 6.13).

- Military personnel overall continued to show higher rates of any smoking (34.3%), compared to civilians (30.4%). However, the rate of heavy smoking for the overall military population (16.3%) was not significantly different from the overall civilian rate (16.0%).

- The prevalence of any smoking was also significantly higher among military men than among civilian men (34.9% vs. 30.8%), but there was no significant difference between the two groups in the prevalence of heavy smoking (16.1% military vs. 16.6% civilian).

- The prevalence of any smoking among women in the military (31.0%) was not significantly different from the prevalence among women in the civilian population (28.2%), but the prevalence of heavy smoking was significantly higher among women in the military (17.5%) than among civilian women (12.1%).

Taken together, findings from the 1992 Worldwide Survey indicate that the military has made considerable progress since 1980 in reducing the prevalence of cigarette smoking among its personnel. However, the rates of any cigarette smoking in the total DoD (35%) and in all four Services (29% to 37%) were all still well above the Healthy People 2000 target of 20% for the military. Further, the prevalence rates of smoking in the military and among military men were still significantly higher than the corresponding rates in the civilian population, and military women were more likely to be heavy smokers than were civilian women.

Smokeless tobacco use in the military, and particularly among young males, is also cause for concern. Nearly one-third of all military men ages 24 and younger used smokeless tobacco in the past year, and nearly half of young men in the Marine Corps used smokeless tobacco in the past year. Given that one of the Healthy People 2000

objectives is to reduce the current prevalence of smokeless tobacco use to no more than 4% of males ages 24 and younger, these findings indicate that DoD and the Services will have to engage in considerable effort to reduce smokeless tobacco use among young males if this objective is to be met within the military.

7. NEGATIVE EFFECTS OF ALCOHOL AND OTHER DRUG USE

Alcohol and other drug use can damage the health, social life, family relationships, and work performance of military personnel. Moreover, the negative effects of alcohol and other drug use are of great practical importance because they can diminish military readiness and, in turn, compromise our nation's security. Alcohol and other drug use may also lead to large expenditures of funds for prevention, intervention, detoxification, rehabilitation, and treatment programs.

The analyses we present in this chapter describe the negative effects of alcohol and other drug use on DoD personnel. We have not considered the damage to health and well-being as a result of tobacco use. (Medical costs associated with tobacco use are discussed in Chapter 8.) First, we examine prior studies of negative effects of alcohol use and drug use. Next, we present data that assess negative effects that respondents attributed to alcohol use and to other drug use. At the conclusion of the chapter we examine effects of alcohol and other drug use on general negative behaviors--that is, negative behaviors not directly attributed by survey respondents to alcohol and other drug use.

7.1 Prior Studies

Many studies have investigated the negative consequences of alcohol use on work performance, health, and social relationships, but fewer studies have examined the negative effects associated with other drug use. Available information about these effects rests on alcohol and drug users' attributions of negative consequences to their drinking or drug use.

7.1.1 Negative Effects of Alcohol Use

Several national surveys of alcohol use funded by NIAAA have documented the magnitude of the effects of alcohol use on work performance, health, and social behavior. Clark and Hilton (1991) examined adults' self-reports of nine problem consequences and four dependence symptoms in 1967 and again in 1984. In 1984, 13.3% of men and 7.1% of women reported having experienced an alcohol-related problem over the past year; 18.8% of men and 8.2% of women reported a dependence symptom. The percentages of men and women reporting a dependence symptom had increased significantly since 1967, but the percentages reporting problems in 1967 and 1984 were not significantly different. Rates of dependence and negative consequences were strongly related to the overall amount of drinking and the maximum consumed per occasion.

The Worldwide Surveys have also assessed the nature and extent of negative effects associated with alcohol use. In 1988, the most commonly cited effect was productivity loss due to alcohol, reported by 22.1% of military personnel. Nine percent had a serious consequence. Events having the highest prevalence, ranging from 2 to 4%, were: 3 or more workdays lost, arrested for alcohol-impaired driving, and fights (Bray et al., 1988).

Polich (1979) is one of the few researchers to have compared the extent of negative consequences among civilians and military personnel. He compared results from Army, Navy, and Air Force surveys during the 1970s to results from the 1969 national alcohol survey on measures of "tangible" problems and serious adverse consequences. After Polich standardized for differences in the demographic composition of civilian and military populations (such as education, age, and marital status), military rates were only slightly higher than civilian rates. This difference could be accounted for by unique conditions of military life such as location, working conditions, or differences in customs and attitudes.

7.1.2 Negative Effects of Drug Use

The consequences of nonmedical use of drugs for work performance, health, and social behavior have been less well documented. The summary report of the 1982 National Household Survey on Drug Abuse (NHSDA) did not include the six survey items on the side effects of medical or nonmedical use of drugs (Miller et al., 1983). Similarly, a set of items in the 1979 NHSDA concerned the effects of marijuana on driving or level of effort, but the findings were not included in the final report (Fishburne, Abelson, & Cisin, 1980). The NHSDA now reports findings from questions on a variety of consequences of any alcohol or other drug use (respondent specifies the type of substance responsible for consequence), ranging from work performance to health, economic problems, cognitive ability, and interpersonal problems.

The 1990 NHSDA (NIDA, 1991a) found that those who had used marijuana in the past year most often reported that they were unable to think clearly (8%), became depressed or lost interest in things (3.4%), felt very nervous and anxious (4.8%), got less work done than usual at school or on the job (3.6%), or felt suspicious and mistrustful of people. Altogether, 15.8% of marijuana users reported at least one problem. Those who used cocaine during the past year indicated that they felt very nervous and anxious (10.7%), felt irritable and upset (6.8%), felt suspicious or mistrustful of people (6.6%), or became depressed or lost interest in things (8.5%). As with marijuana, 15.7% of cocaine users reported at least one problem. These data suggest that the types of negative effects may depend on the particular drug and may not occur uniformly across all drugs.

7.2 Negative Effects of Alcohol Use

In this section, we examine negative effects of alcohol consumption on military personnel. First we examine trends in negative effects and contrast findings from the 1980 to the 1992 Worldwide Surveys. Next we examine (a) negative effects as a function of pay grade and (b) the role of drinking levels on serious consequences.

7.2.1 Trends in Negative Effects

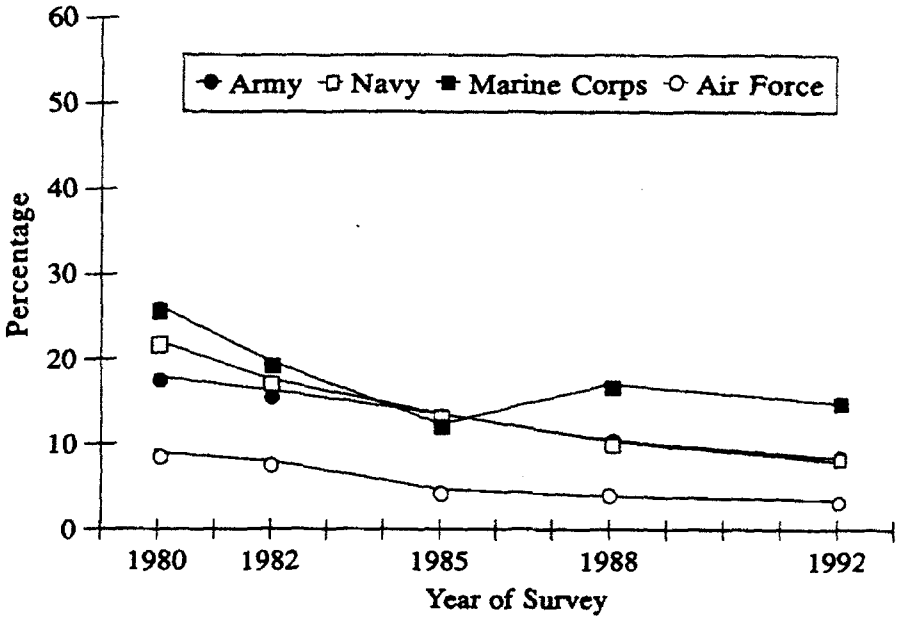
Alcohol-related negative effects have declined significantly since 1980. In 1992, 7.6% of military personnel reported having experienced a serious consequence associated with alcohol use during the past year, 16.4% reported some productivity loss, and 5.2% reported one or more symptoms of dependence (Table 3.1 in Chapter 3). Our definition of dependence, as described in Section 2.6.4, does not reflect the strict definition used in the Diagnostic and statistical manual of mental disorders (DSM-III-R). Rather, it only includes one or more symptoms commonly associated with dependence. Between 1980 and 1992, the decreases in each of the indicators were statistically significant. All three categories of negative effects declined relative to 1988; however, only the reduction in productivity loss was statistically significant.

The same reductions in negative effects that we observed for total DoD also occurred for personnel in each of the Services. Figures 7.1, 7.2, and 7.3 (see also Tables D.1-D.4) show Service trends for each of the three types of negative effects due to alcohol use.

As shown in Figure 7.1, serious consequences declined for each of the Services between 1980 and 1992. Serious consequences in the Army declined from 17.9% to 8.0%, the Navy from 22.1% to 8.4%, the Marines from 26.2% to 14.8%, and the Air Force from 9.0% to 3.5%. With the exception of the Marine Corps, we found a steady decline in alcohol-related serious consequences for each Service over the five surveys. Unlike the other Services, the reductions we observed for the Marine Corps between 1980 and 1982 and again between 1982 and 1985 were statistically significant, with only half as many Marines reporting serious consequences in 1985 compared to 1980. However, between 1985 and 1988, alcohol-related serious consequences increased in the Marine Corps and then showed a slight decline between 1988 and 1992.

As shown in Figure 7.2, productivity loss increased for each of the Services between 1980 and 1982 followed by a return roughly to 1980 levels in 1985. Since 1985, all of the Services except for the Marines have shown a steady decline in loss of productivity. With the Marines, the situation followed the same pattern as serious consequences, with an increase between 1985 and 1988 and a slight decline between 1988 and 1992. Comparing 1992 with 1980, each of the Services has shown a statistically significant reduction over the 12-year period.

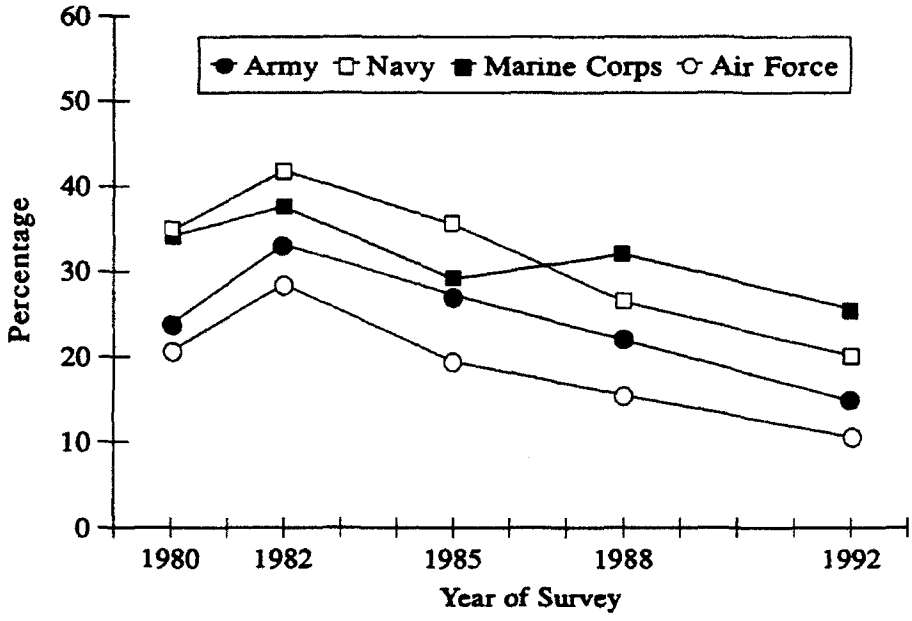
Figure 7.1 Trends in Alcohol-Related Serious Consequences, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

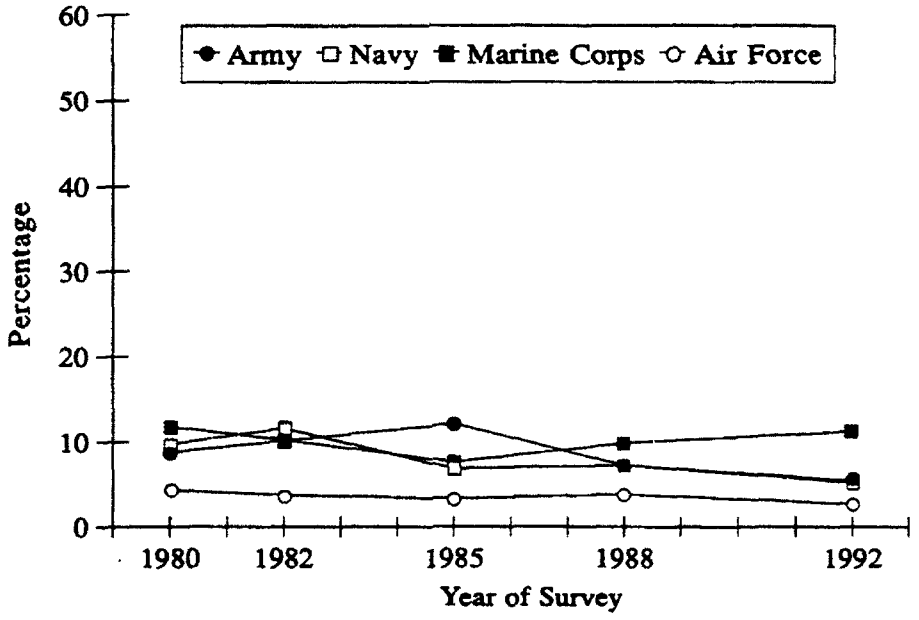
Figure 7.2 Trends in Alcohol-Related Productivity Loss, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 7.3 Trends in Alcohol-Related Dependence, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

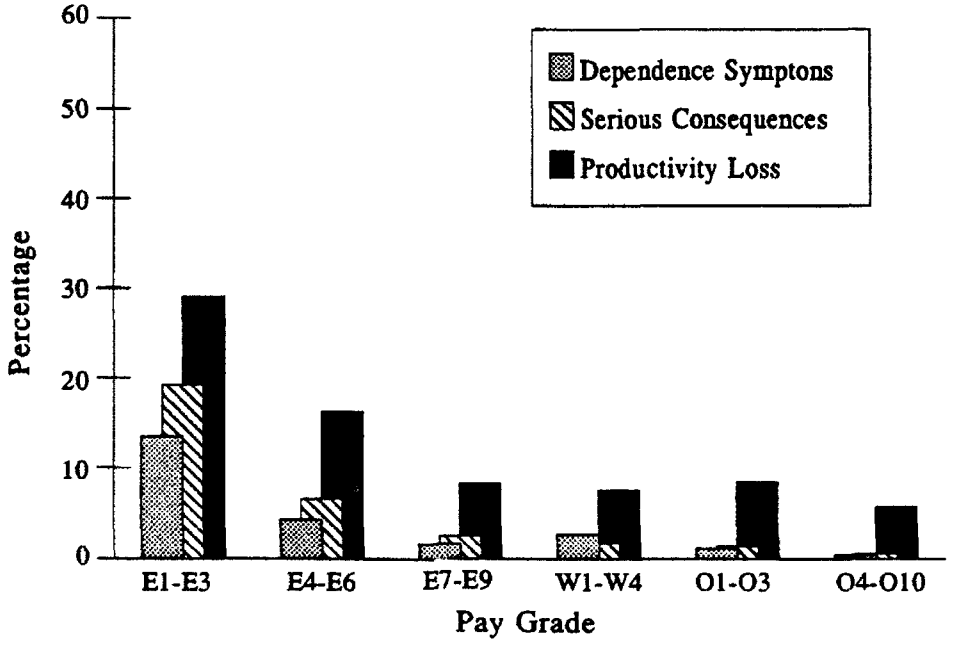
As shown in Figure 7.3, trends in symptoms of alcohol dependence have shown a somewhat different pattern than serious consequences or productivity loss. For the Army, alcohol dependence symptoms increased from 8.8% in 1980 to 12.1% in 1985, declined significantly to 7.2% in 1988, and dropped further to 5.4% in 1992. For the Navy, dependence symptoms increased from 9.7% in 1980 to 11.6% in 1982, dropped significantly in 1985, and have remained fairly constant since ending at 5.2% in 1992. The Air Force has shown the fewest dependence symptoms throughout the 12-year period, from 4.3% in 1980 down to 2.7% in 1992. Again, the pattern for the Marine Corps is markedly different from the trends for the other three Services, with dependence symptoms decreasing between 1980 and 1985 and then increasing from 1985 back to the 1980 level in 1992. Unlike the other Services, the difference for the Marines between the 1980 and 1992 levels was not statistically significant.

7.2.2 Pay Grade Differences

Because, as discussed in Chapter 4, those in the lower pay grades are more likely to drink heavily, a similar distribution might be expected for negative effects. As Figure 7.4 indicates, there were considerable variations in the problems reported by individuals in different pay grades (see also Table D.23). The highest levels of serious consequences, productivity loss, and dependence symptoms consistently occurred in the lowest pay grades, E1 to E3. Generally, those in higher pay grades had fewer alcohol negative effects for serious consequences, productivity loss, and dependence symptoms, with those in the highest pay grades, O4 to O10, having the lowest prevalences. For total DoD, 19.2% of junior enlisted personnel (E1-E3s) but only 0.6% of senior officers (O4-O10s) reported the occurrence of serious consequences due to alcohol consumption. For productivity loss, 29.1% of E1-E3s reported a problem compared with 5.7% of O.O4-O10s. The level of dependence symptoms was 13.5% for E1-E3s, and 0.5% for O4-O10s. The pattern we observed for total DoD occurred for all of the Services.

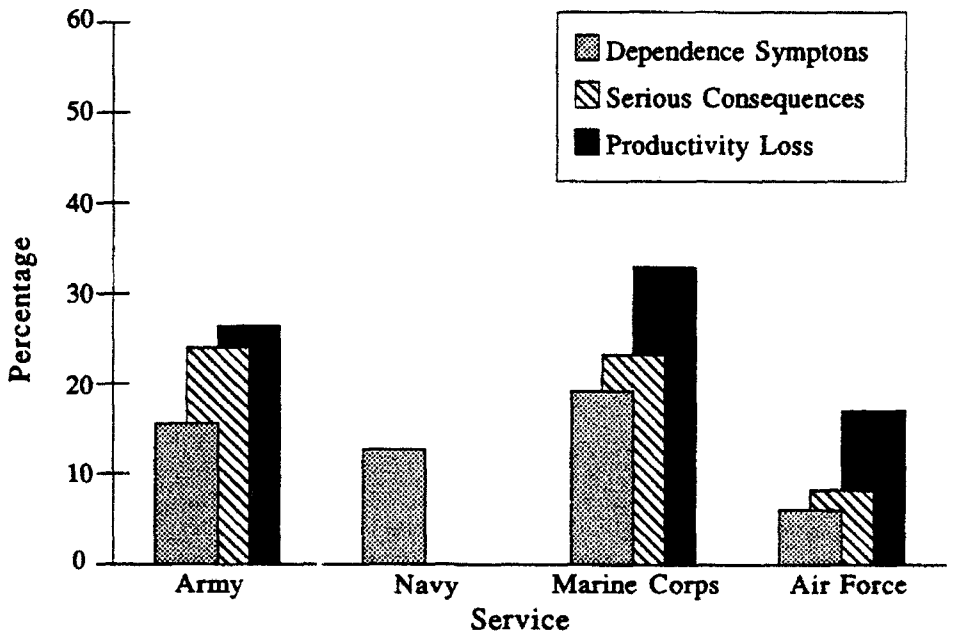
In view of the high rates of problems among E1-E3s, we have made Service comparisons for that group in Figure 7.5 (see also Table D.23 in Appendix D). Over a third of E1-E3s in the Marines, a fourth of those in the Army, and about one-sixth of

Figure 7.4 Alcohol Use Negative Effects, by Pay Grade, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 7.5 Alcohol Use Negative Effects for E1-E3s, by Service



Note: Estimates of serious consequences and productivity loss for Navy E1-E3s are not shown (unreliable estimates). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

those in the Air Force reported productivity loss. About a quarter of E1-E3s in the Army and Marines and a tenth of those in the Air Force reported serious consequences. (We made no estimates for serious consequences or productivity loss for Navy E1-E3s because of large standard errors.) Finally, from 12 to 19% of E1-E3s in the Army, Navy, and Marines experienced dependence symptoms, along with 6% for the Air Force. Because junior enlisted personnel comprise a substantial segment of the military, these large rates of negative effects show that there is still much work to be done to reduce alcohol problems.

7.2.3 Drinking Levels and Serious Consequences

It is clear from the preceding sections that negative effects of alcohol use remain a substantial problem for the military. To better understand the influence of drinking levels on serious consequences, we examined the relationship between drinking levels (omitting abstainers) and percentage of personnel with one or more alcohol-related serious consequences (see Table 7.1). Over a quarter of heavy drinkers had one or more serious consequences (25.6%), a rate that was more than three times as great as for any

Table 7.1 Alcohol Use Serious Consequences, by Drinking Level

Drinking Level	Serious Consequence
Infrequent/light	6.1 (1.4)[a]
Moderate	2.9 (0.4)[b]
Moderate/heavy	6.8 (1.0)[c]
Heavy	25.6 (3.2)[a,c]

Note: Entries are percentages of personnel with 1 or more alcohol-related serious consequences. Standard errors are in parentheses.

[a]Significantly higher than for moderate drinkers.

[b]Significantly lower than for infrequent/light drinkers.

[c]Significantly higher than for infrequent/light drinkers.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

other group of drinkers. We observed the next highest prevalence among those who were moderate/heavy drinkers, with 6.8% experiencing at least one serious consequence. The lowest rate occurred among moderate drinkers (2.9%) rather than among the infrequent/light drinkers (6.1%), which is counterintuitive. One would expect the lightest drinkers to encounter the fewest number of consequences. One possible explanation is that light drinkers were more likely or willing to attribute a problem to their drinking. Another possibility is that the light/infrequent drinking group contained a subgroup of binge drinkers who, although they did not drink frequently, encountered problems when they did.

7.3 Negative Effects of Drug Use

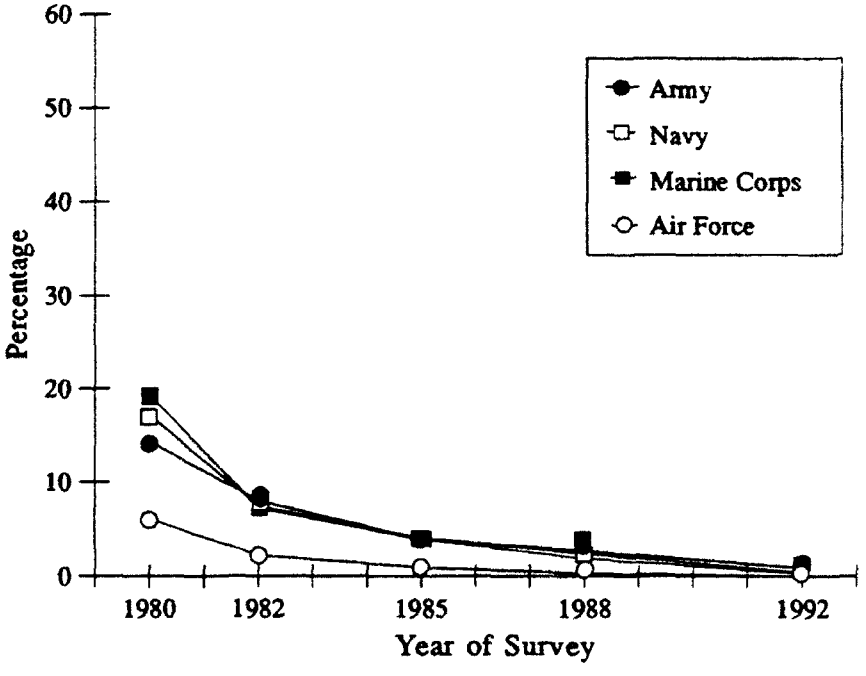
In this section we examine negative effects due to drug use. First we examine trends in negative effects and contrast findings from the 1980 Worldwide Survey to the 1992 Worldwide Survey. Next we consider negative effects as a function of pay grade and then examine the relationship between negative effects and drug use patterns.

7.3.1 Trends in Negative Effects

Drug-related negative effects decreased significantly from 1980 to 1992. In 1980, 13.3% of military personnel reported a serious consequence associated with drug use, and this rate declined to 0.4% in 1992. Also in 1980, 14.4% of personnel indicated some productivity loss due to drug use, and this declined to 0.7% in 1992 (see Table 3.1,

Chapter 3). Figures 7.6 and 7.7 (see also Tables D.1-D.4) show the patterns of drug-related negative effects for the Services. As shown, the Services all have significant declining patterns from 1980 to 1992 for both indicators. For serious consequences, the Army declined from 14.4% in 1980 to 0.9% in 1992, the Navy from 17.2% in 1980 to 0.4% in 1992, the Marines from 19.4% in 1980 to 0.3% in 1992, and the Air Force from 6.1% in 1980 to essentially zero in 1992. For all the Services, the decline between 1988 and 1992 was statistically significant. For productivity loss the Army declined from 15.7% in 1980 to 0.9% in 1992, the Navy from 18.8% in 1980 to 0.9% in 1992, the Marines from 20.8% in 1980 to 1.4% in 1992, and the Air Force from 6.4% in 1980 to 0.1% in 1992. Consistent with the sharp reductions in drug use, these data indicate that all of the Services have made impressive progress in reducing the negative effects due to drug use among military personnel.

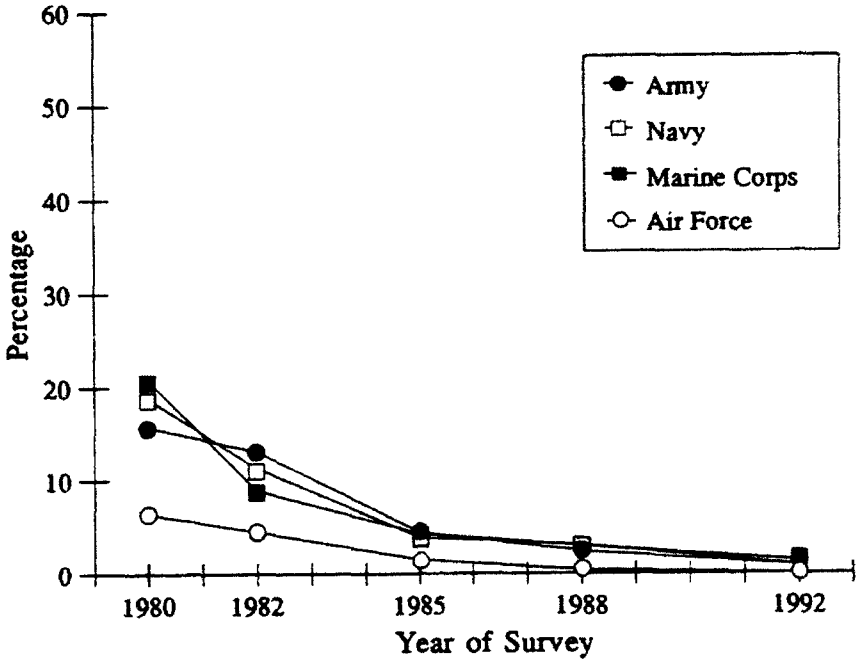
Figure 7.6 Trends in Drug-Related Serious Consequences, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 7.7 Trends in Drug-Related Productivity Loss, by Service, 1980-1992



Note: Estimates have not been adjusted for sociodemographic differences among Services.

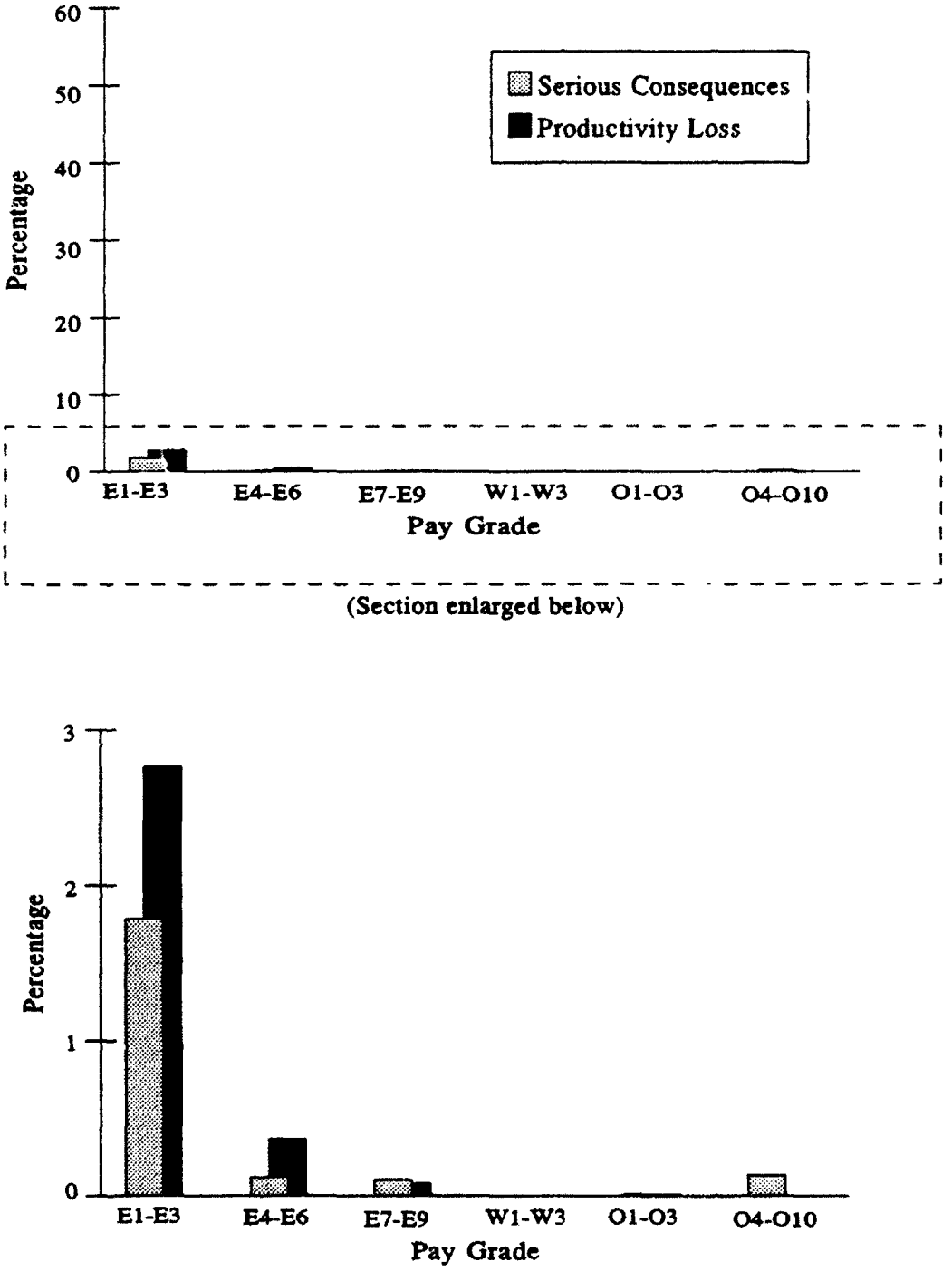
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

7.3.2 Pay Grade Differences

Figure 7.8 illustrates how negative effects of drug use are distributed across pay grade for the total DoD. The results for total DoD show that drug use negative effects occurred almost exclusively among junior enlisted personnel in pay grades E1 to E3 (see also Table D.24 in Appendix D). Serious consequences were reported by 1.8% of E1-E3s and productivity loss by 2.8% of this group. E4-E6s showed the next highest level of effects, with 0.1% reporting serious consequences and 0.4% productivity losses. The remaining pay grades showed only traces of either effect. This pattern for DoD holds for the individual Services.

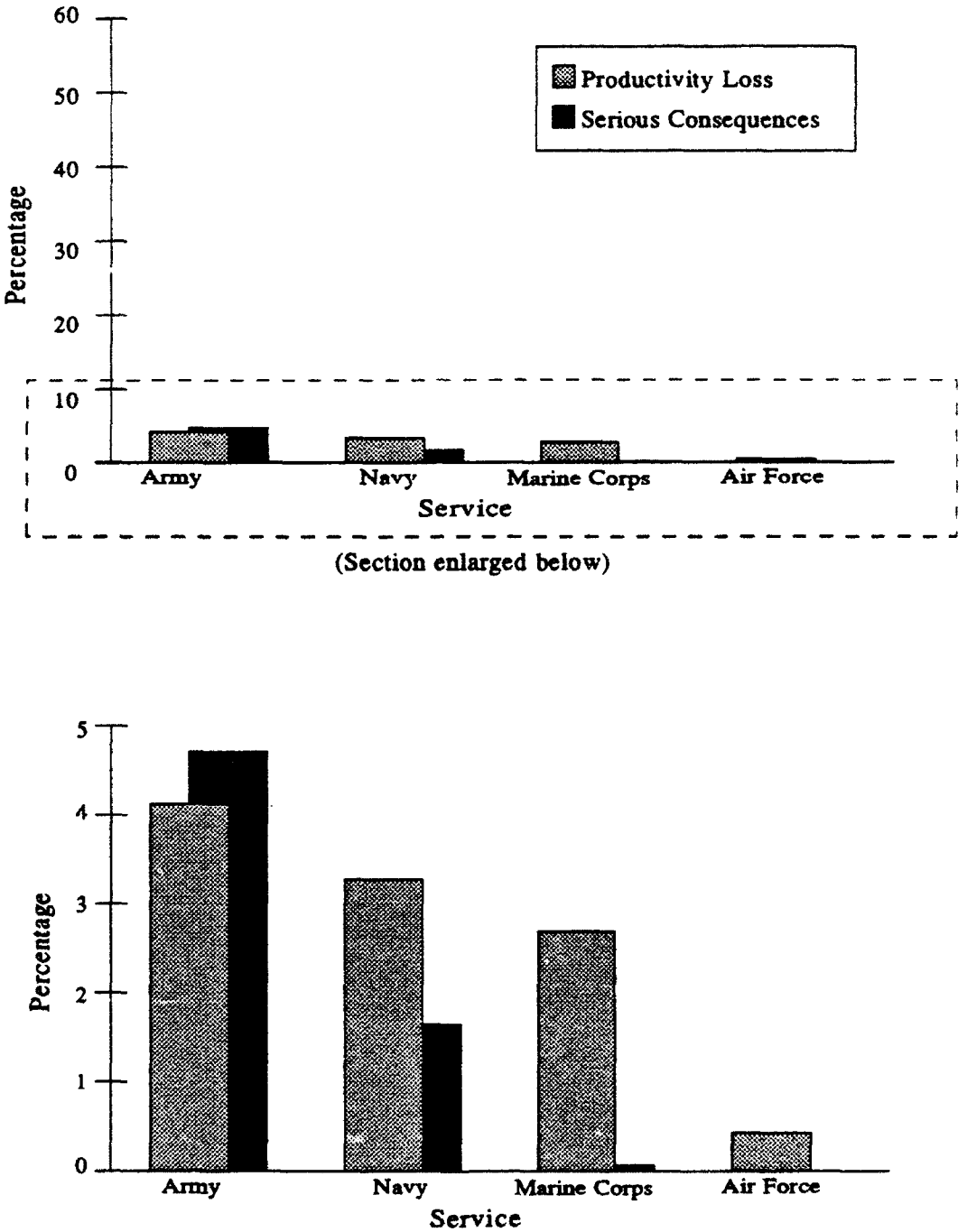
Drug use negative effects among E1-E3s are shown for the Services in Figure 7.9 (see also Table D.24 in Appendix D). Among E1-E3s, the largest percentages of serious consequences and productivity loss, respectively, occurred among E1-E3s in the Army (4.8%; 4.1%) and Navy (1.7%; 3.3%). The Marines, the Service with the highest rate of drug use in 1992, reported almost no serious consequences (0.7%) although 2.7% reported a loss of productivity. The concentration of negative effects among the lower pay grades is

Figure 7.8 Drug-Use Negative Effects, by Pay Grade, Total DoD



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 7.9 Drug-Use Negative Effects for E1-E3s, by Service



Note: Estimates have not been adjusted for sociodemographic differences among Services.
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

consistent with findings presented in Chapter 5 that the largest amount of drug use occurred among junior enlisted personnel.

7.3.3 Drug Use Patterns and Serious Consequences

To better understand the influence of drug use behavior on serious consequences, we examined the relationship between drug use category and percentage of personnel with one or more serious consequences (see Table 7.2). A much smaller percentage of those who used only marijuana encountered a consequence (1.8%) than those who used other patterns of drugs, including marijuana and other drugs (8.4%), a difference that was statistically significant. These results suggest that the Services should focus especially on patterns of drug use besides marijuana use exclusively. Prevention efforts should continue to emphasize the undesirable negative consequences of drug use as well as its unacceptability and illegal status.

7.4 Multivariate Analysis of Substance Use and General Negative Behaviors

So far, we have discussed whether military personnel believed that they experienced negative effects as a result of their use of alcohol or drugs. Although this approach is useful, some individuals may have rationalized their negative behavior by attributing it to alcohol or drug use. An alternative approach to examining negative effects of alcohol and drug use is to ask respondents about negative events that have happened to them without any attribution for the reason they occurred, and then to test for an association of these events with drug and alcohol use as well as with other variables.

Table 7.2 Drug-Related Serious Consequences, by Drug Use Category

Drug Use Category	Serious Consequence
Marijuana only	1.8 (1.2)
Any other use	8.4 (2.3)*

Note: Entries are percentages of personnel with 1 or more drug-related serious consequences. Standard errors are in parentheses.

*Significantly higher than for marijuana-only users.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

In the 1992 survey, we asked questions near the beginning of the questionnaire about the frequency with which a series of negative events may have happened during the past year (see Questions 16 and 17 in Appendix G). These items appeared before any questions about substance use behavior or about negative events attributed to substance use to minimize any artifactual association with answers about negative behaviors and substance use.

To test for the relationship of alcohol and drug use patterns and negative behaviors, we conducted a series of multiple regression analyses using an index of general negative behaviors as the dependent variable. The index was a linear combination obtained by summing the frequencies of 25 different negative behaviors experienced in the past 12 months. We estimated two linear regression models separately for enlisted males, enlisted females, and officers. The first regression model contained only the basic demographic variables plus an indicator variable reflecting participation in Operation Desert Shield/Desert Storm as independent variables, whereas the second model enhanced this basic model by adding perceived job stress, drinking levels, and drug use pattern to the independent variables in the basic model.

We first discuss the full model and then compare the full and basic model with respect to the effects of the demographic variables and the Desert Shield/Desert Storm indicator variable. We focus on the highlights of the models here; parameter estimates for all of the variables in the models that we discuss in Sections 7.4.1 through 7.4.3 appear in Tables F.8 through F.10 in Appendix F.

7.4.1 Enlisted Males

For enlisted males, all of the demographic variables except for education level, region, and Desert Shield/Desert Storm were statistically significant in predicting negative behaviors. Service, race/ethnicity, and pay grade were highly significant at the .001 level (see Table F.8 in Appendix F). The statistically significant regression parameters indicated that, after we adjusted for all other variables in the model, negative behaviors were higher among:

- Army, Navy, and Marine enlisted males than Air Force enlisted males;
- blacks than whites;
- those married with spouse absent than single enlisted males;
- E1-E6s than E7-E9s;
- infantry than craftsmen;
- younger than older enlisted males;

- heavy or moderate/heavy drinkers than abstainers;
- drug users than non-drug users; and
- those with high job stress than those with low job stress.

The Air Force had the lowest rate of negative behaviors and the Army the highest. The Navy and Marine Corps fell in between. Compared to the Air Force, the average number of negative behaviors for the other three services ranged from approximately 0.5 to 1 negative behavior higher.

Whites and Hispanics had the lowest negative behavior rate while blacks had the highest. Blacks averaged about 1.5 more negative behaviors than whites and Hispanics. The negative behavior rate for "others" fell in between, but was not significantly higher than the white or Hispanic rate.

Married males with spouse absent averaged 0.66 more negative behaviors than married males with spouse present. Interestingly, the single group had about the same level of negative behaviors as the group of married males with spouse present.

Pay grade had a particularly strong effect on negative behaviors relative to the other demographic variables. The lowest pay grade group for enlisted males (E1-E3s) exhibited, on the average, 2.44 more negative behaviors than the highest pay grade group (E7-E9s); the middle pay grade group (E4-E6s) averaged 1.16 more negative behaviors than the highest pay grade group.

Electrical/mechanical technicians, service and supply handlers, and nonoccupational personnel had higher rates of negative behaviors than enlisted males in communications or intelligence, health care, other technical or allied specialties, and craftsmen. For example, service and supply handlers averaged about 1.5 more negative behaviors than craftsmen.

Age, although significantly related to negative behaviors, was not a strong predictor. Each additional year of age only decreased the average rate of negative behaviors by 0.036.

The relationship between participation in Desert Shield/Desert Storm and negative behaviors was not statistically significant. That is, after we adjusted for all other variables in the model, there was no statistically significant difference in the rate of negative behaviors experienced among those who served in Desert Shield/Desert Storm and those who did not serve.

Job stress, drinking level, and drug use patterns were all powerful predictors of negative behaviors. In general, they were much more powerful predictors than the demographic variables. Those who perceived a high level of job-related stress averaged 3.87 more negative behaviors than those who perceived low job-related stress. Heavy drinkers averaged 2.37 more negative behaviors than abstainers, while moderate/heavy drinkers averaged 1.40 more negative behaviors than abstainers. Enlisted males using drugs averaged 2.47 more negative behaviors than those not using drugs.

Results from the basic demographic model were similar to those from the full model with respect to the estimated parameters associated with the demographic variables. However, there were some differences. Race/ethnicity was not significant in the basic demographic model and participation in Desert Shield/Desert Storm was significant. Those who participated in Desert Shield/Desert Storm averaged 0.57 more negative behaviors than those who did not participate. While significant, this estimated parameter was relatively small. Furthermore, this is the only regression analysis (out of many) in which Desert Shield/Desert Storm was statistically significant.

7.4.2 Enlisted Females

The estimated regression parameters in the model for enlisted females were quite distinct from those in the model for enlisted males (see Table F.9 in Appendix F). Among the demographic variables, only Service, race/ethnicity, region, and occupational classification were statistically significant.

The difference between the Marine Corps and the Air Force in the level of negative behaviors was not statistically significant. However, both the Army and the Navy exhibited significantly higher levels of negative behaviors than did the Air Force. Their average levels of negative behaviors were 1.17 and 1.37 higher, respectively, than for the Air Force. Blacks had the highest level of negative behaviors and Hispanics the lowest. Blacks averaged 1.09 more negative behaviors than whites.

There were large differences in the level of negative behaviors across the nine occupational categories. Lower rates of negative behaviors were found for females in communications or intelligence, other technical or allied specialties, functional support, and craftsmen, relative to service and supply, and electrical/mechanical. For example, females in communications and intelligence averaged 3.07 fewer negative behaviors than service and supply handlers. The estimated parameters associated with the demographic variables for the basic and the full models were quite similar to one another for enlisted females.

Drinking level and drug use were not significantly related to negative behaviors as they were for enlisted males. Perceived job stress was the most important and most

statistically significant predictor of negative behaviors. Females perceiving a high level of job stress averaged 4.30 more negative behaviors than those perceiving low job stress.

In general, we found that the enlisted female and enlisted male models were quite different. For females, only perceived job-related stress and occupational classification were highly related to negative behaviors. In contrast, for males, perceived job-related stress, drinking level, drug use, and all but two demographic variables were highly significant.

7.4.3 Officers

For officers, the only demographic variables that were significant predictors of negative behaviors were Service and race/ethnicity. The estimated regression parameters associated with the demographic variables in this full model were very similar to the corresponding parameter estimates in the basic demographic model.

Drug use and perceived job-related stress were each significant at the .001 level while drinking level was significant at the .05 level. Officers perceiving a high level of job stress averaged 2.11 negative behaviors more than those who perceived a low level of job stress. Officers who reported drug use averaged 3.23 more negative behaviors than those who reported no drug use and heavy drinkers averaged 2.41 more negative behaviors than abstainers.

The estimated regression parameters associated with these three psychosocial variables were much larger than the parameters associated with the significant demographic variables. The negative impact of drug use and heavy drinking on behavior is clearly illustrated. This finding is all the more significant because we were dealing with a group of functional people who were employed full-time. Most studies demonstrating a negative impact of drug use and heavy alcohol use on behavior are based upon clients in drug abuse treatment programs. These individuals are generally unemployed, undereducated, and involved in illegal activities; more importantly, they tend to be daily polydrug users (Hubbard et al., 1989).

Recall that a major interest in these analyses was to examine the relationship among negative behaviors, heavy drinking, and drug use. Table 7.3 presents adjusted means of general negative behaviors for drinking levels and drug use categories among enlisted males, enlisted females, and officers, with the adjustment controlling for all other variables in the regression model. The relatively strong negative impact of drug use and heavy drinking on negative behaviors was consistent across enlisted males and officers (who were also predominantly male). Those who drank heavily or those who used drugs were significantly more likely than nonusers to experience negative behaviors. In contrast to this finding for enlisted males and officers, drug use and heavy drinking were

Table 7.3 Adjusted Means of General Negative Behaviors, by Drinking Level and Drug Use Category

Behavior	Group/Adjusted Mean Score		
	Male Enlisted	Female Enlisted	Officers
Drinking Level			
Abstainer	5.19 (0.33)	6.26 (0.31)	2.94 (0.17)
Infrequent/light	6.11 (0.20)[a]	6.41 (0.36)	2.92 (0.18)
Moderate	5.75 (0.16)	6.83 (0.48)	3.00 (0.16)
Moderate/heavy	6.60 (0.17)[a]	6.12 (0.35)	3.24 (0.21)
Heavy	7.56 (0.31)[a]	7.41 (1.03)	5.35 (0.67)[a]
Drug Use Category			
No use	6.10 (0.10)	6.37 (0.17)	3.12 (0.10)
Any drug use	8.57 (0.59)[b]	8.23 (1.12)	6.35 (0.82)[b]

Note: Entries are mean scores (with standard errors in parentheses) of the number of occurrences of general negative behaviors that have been adjusted for the effects of all other variables in the regression model.

[a]Significantly greater than abstainers.

[b]Significantly greater than nonusers.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

not significant predictors of negative behaviors for enlisted females. One reason for the lack of statistical significance was that there were relatively few heavy drinkers or drug users among enlisted females and, hence, the standard errors for the estimated regression parameters associated with these variables are large.

These findings about the higher levels of negative behaviors associated with drug use and heavy drinking coupled with similar findings for higher perceived job-related stress suggest areas that the military should target with prevention and education programs. Program efforts can highlight the finding that negative events are more likely to occur among people in high-use groups or among those in highly stressful jobs, and can provide appropriate education about drug and alcohol policy as well as offering ways to deal with stress. The consistent relationship between occupational classification and negative behaviors for both enlisted males and enlisted females also suggests that some reduction in negative consequences may be accomplished by better matching of personal characteristics with job requirements. In addition, stress reduction programs could focus more on those occupations with the highest risk of negative behaviors.

7.5 Summary

The negative effects associated with both alcohol use and drug use declined significantly from 1980 to 1992. Analyses examined negative behaviors attributed to alcohol or drug use and general negative behaviors not attributed to alcohol or drug use.

7.5.1 Alcohol Use Negative Effects

We measured alcohol use negative effects in terms of any serious consequences, productivity loss, and dependence symptoms. Trends in alcohol use negative effects are shown in Figures 7.1 through 7.3.

- Alcohol-related negative effects have declined significantly since 1980. In 1992, 7.6% of all military personnel experienced at least one alcohol-related serious consequence, 16.4% had some alcohol-related productivity loss, and 5.2% showed signs of alcohol dependence. Between 1988 and 1992 all three measures showed a declining pattern, but only the decrease in productivity loss was statistically significant. We observed similar declines for each of the Services.

- Alcohol-related serious consequences, productivity loss, and dependence symptoms were substantially higher among the E1-E3 pay grades than among other pay grades (see Figure 7.4 and Table D.23). For any serious consequences and symptoms of dependence, rates for E1-E3s were almost three times as high as the rates for E4-E6s and for productivity loss, more than 10 percentage points higher.

In view of the high rates of alcohol-related problems among E1-E3s, we made Service comparisons for that group. These comparisons are shown in Figure 7.5 and Table D.23.

- About one quarter of E1-E3s in the Army and Marines (23.9% and 23.1%, respectively), one fifth of those in the Navy (19.7%), and slightly less than a tenth of those in the Air Force (8.2%) experienced alcohol-related serious consequences during the past 12 months.

- Approximately one third or more of E1-E3s in the Navy and the Marines (35.3% and 32.9%), a fourth of those in the Army (26.3%), and about one sixth of those in the Air Force (17.0%) had productivity loss during the past 12 months.

- From about 12 to 19% of E1-E3s in the Army, Navy, and Marine Corps experienced symptoms of dependence, along with about 6% of E1-E3s in the Air Force.

- Drinking levels were positively related to serious consequences. Heavy drinkers were most likely to encounter alcohol-related consequences (25.6%), followed by moderate/heavy drinkers (6.8%) (see Table 7.1).

7.5.2 Drug Use Negative Effects

Negative effects of drug use were measured by serious consequences and productivity loss. Trends in drug-related negative effects are shown in Figure 7.6 for serious consequences and in Figure 7.7 for productivity loss.

- Drug-related negative effects have decreased significantly since 1980. In 1992, 0.4% of all military personnel experienced a serious negative effect associated with drug use and 0.7% an instance of productivity loss. The decreases in any serious consequences between 1988 and 1992 were statistically significant for DoD and for each of the individual Services (see also Table 3.1).

- Although drug-related negative effects were rare overall, they were more likely to occur among E1-E3s than among the other pay grades (see Figure 7.8 and Table D.24).

- Among E1-E3s, the largest percentages of serious consequences and productivity loss, respectively, occurred in the Army (4.8%; 4.1%) and Navy (1.7%; 3.3%), as illustrated in Figure 7.9 and Table D.24.

- Although the rate of drug-related serious consequences among E1-E3s in the Marine Corps was very low (0.7%), 2.7% experienced drug-related loss in productivity (see Figure 7.4 and Table D.24).

- Drug use patterns were positively related to serious consequences. A larger percentage of users of drugs other than or in addition to marijuana reported significantly more serious consequences (8.4%) than users of marijuana only (1.8%) (see Table 7.2).

7.5.3 Alcohol and Other Drug Use and General Negative Behaviors

An alternate approach to examining negative effects of alcohol and drug use was to ask respondents about negative events that had happened to them without any attribution as to the reason and then to test for an association of these events and substance use. These negative behaviors included such things as an illness of a week or longer, not getting promoted, being arrested, getting into arguments or fights, hitting another person, having spouse leave or threaten to leave the relationship, having a car collision, or neglecting family responsibilities. These associations were tested using multivariate linear regression analyses.

- Heavy drinking and drug use were associated significantly with a higher number of general negative behaviors for enlisted males and officers, but not for enlisted females. Heavy drinkers experienced significantly more negative behaviors during the past year than abstainers (7.56 vs. 5.19 for enlisted males; 5.35 vs. 2.94 for officers). Similarly, personnel who used any drugs experienced significantly more negative behaviors than those who did not (8.57 vs. 6.10 for enlisted males; 6.35 vs. 3.12 for officers). (See Table 7.3.)

- Perceived job stress was also highly related to negative behaviors for enlisted males, enlisted females, and officers. Perceived high stress at work compared to perceived low stress at work was associated with 3.87 more negative behaviors for enlisted males, 4.30 more negative behaviors for enlisted females, and 2.11 more negative behaviors for officers (see Tables F.8-F.10).

- The data suggest that male heavy drinkers and drug users, along with all personnel who perceive job stress, are important groups to target in education and prevention efforts. The finding for job stress suggests that stress reduction techniques may help reduce negative behaviors.

The military has shown dramatic reductions in alcohol-related and drug-related negative behaviors during the 12-year period from 1980 to 1992. Nevertheless, drug use and heavy drinking were positively related to general negative behaviors. Heavy drinkers and drug users among enlisted males were significantly more likely than nonusers to experience negative behaviors.

8. SELECTED MEDICAL COSTS OF ALCOHOL AND CIGARETTE USE AMONG ACTIVE DUTY PERSONNEL

The objective of this chapter is to estimate the cost attributable to heavy drinking and heavy smoking incurred by the military in providing selected medical services to active duty personnel. Little is known about the relative impact of the use of these substances on medical costs among the active force. On the one hand, we might expect that the military medical system would incur substantial costs from heavy use of alcohol and cigarettes, because research has shown that military personnel use these substances at significantly higher rates than civilians (e.g., Bray, Marsden, & Peterson, 1991; see also similar results for the 1992 survey in Chapters 4 and 6). Higher rates of use could translate into substantial costs for associated health-related problems for military personnel. On the other hand, we might expect that the military medical system would incur very few additional costs attributable to heavy smoking and drinking among active duty personnel, because the military population is relatively young and vigorous and has frequent turnover of personnel. Diseases associated with heavy smoking and heavy drinking, such as lung cancer, emphysema, and cirrhosis, have long latency periods and emerge primarily at older ages. Therefore, smoking and drinking-related illnesses may not surface until after active duty personnel have left military service.

In analyzing the medical costs that are attributable to heavy alcohol use and heavy smoking, we have focused on a narrowly defined set of costs. Specifically, we have estimated only:

- costs borne by the military as a whole, but not those borne by individuals or by other segments of society;
- tangible medical costs (e.g., the costs of military outpatient visits), but not nonmedical costs and intangible costs (e.g., lost productivity, increased training costs, educational costs, turnover, costs of damaged equipment, *etc.*);
- tangible medical costs imposed on the DoD by heavy drinkers and heavy smokers, but not the medical costs, if any, they impose on others; and
- the cost of providing selected medical services to active duty personnel, but not to retirees, dependents, or others.

8.1 Prior Studies

Few studies have estimated the economic costs of alcohol and tobacco use to individuals and society, in part because many of the costs are difficult to estimate with available data. The first study to generate comparable and consistent economic cost estimates for alcohol abuse, drug abuse, and mental illness was an RTI study by Cruze,

Harwood, Kristiansen, Collins, and Jones (1981). The authors followed the methodological guidelines for cost-of-illness studies suggested by the U.S. Public Health Service (Hodgson & Meiners, 1979). Hodgson and Meiners established an analytical framework for cost-of-illness studies and recommended empirical procedures intended to develop consistent and comparable cost estimates across studies.

Cruze et al. (1981) made a major contribution to analyzing substance abuse disorders. Nevertheless, the cost estimates are now outdated, and the authors did not examine several significant impacts due to conceptual uncertainties and data limitations. Harwood, Napolitano, Kristiansen, and Collins (1984) improved Cruze et al.'s methodology, identified more comprehensive data sets, used a consequences approach as a variant of the conventional cost-of-illness methodology, and developed a procedural guide for updating the cost estimates in future years. They assembled data on the incidence and prevalence of alcohol, drug abuse, and mental illness (ADM) disorders; health service utilization; productivity and earnings; and crime effects. Using a consequences approach to the cost-of-illness methodology suggested by Hodgson and Meiners (1979), they estimated the economic cost of ADM to be $191 billion in 1980. The economic cost of alcohol abuse alone was an estimated $90 billion. Although the Harwood et al. study is a comprehensive analysis of the economic costs of alcohol abuse, there are several adverse consequences of alcohol abuse it did not quantify and value. Furthermore, some of the methodological approaches have been questioned recently by other researchers (e.g., Heien & Pittman, 1989).

Rice, Kelman, Miller, and Dunmeyer (1990) essentially replicated the Harwood et al. (1984) methodology and estimated the 1985 cost of alcohol abuse to be $70.3 billion. The largest component of this cost is morbidity, which represents the value of goods and services lost by individuals' inability to perform their usual activities. Morbidity is commonly measured by the estimated earnings foregone due to alcohol abuse. Rice et al. (1990) estimated that morbidity costs accounted for 39% of total alcohol abuse costs. In contrast, Harwood et al. (1984) estimated that morbidity costs were even more important, accounting for 56% of total alcohol abuse costs.

These studies examine a broader range of costs and methods than we examine in the current analysis. We consider only tangible medical costs and do not include known costs of alcohol abuse represented by the military's treatment and rehabilitation programs (see discussion in Chapter 9). Some of those costs were considered recently by Caliber Associates (1989) when they conducted a cost-benefit study of the Navy's Level III Alcohol Rehabilitation Program. However, their objective was quite different from our own. Caliber estimated the benefits of alcohol treatment as the avoided costs of having to recruit and train replacement personnel in various skill ratings at various lengths of service. Caliber did not estimate either the relationship between alcohol use and the use

of medical services, or the incremental costs of providing medical services to heavy drinkers or smokers.

A study closely related to the approach we use in our analyses was conducted by Manning, Keeler, Newhouse, Sloss, and Wesserman (1991), who studied the external costs of three negative health behaviors: smoking, drinking heavily, and not exercising. External costs are those that people with these habits impose on others. Their conceptual framework is analogous to the one we develop below. Manning et al. estimated the relationships between the three negative behaviors and (a) the number of episodes of outpatient medical treatment and (b) the number of continuous periods of hospitalization.

Manning et al. conducted their analyses on two data sets: the Health Insurance Experiment (HIE) and the National Health Interview Survey (NHIS). The HIE was a randomized trial of alternative health insurance arrangements in fee-for-service and prepaid group practices. It collected detailed data from nearly 6,000 individuals on their demographic characteristics, their use of medical services, and their smoking and drinking habits. The NHIS collected similar data from about 16,000 persons.

Regarding the relationship between drinking and medical services, multiple regression analyses of the HIE found the number of outpatient visits to be generally unrelated to drinking. The NHIS data showed that former drinkers had fewer outpatient visits but more inpatient hospital stays than current infrequent drinkers. For those who were currently drinking, there was no relationship between monthly consumption and hospitalization.

Regarding the relationship between smoking and medical costs using the HIE, Manning et al. found a weak and inconsistent relationship between smoking and outpatient visits. In general, they found that current and former smokers had more "habit-related" outpatient episodes (for certain cancers and other diseases generally attributed to smoking) than nonsmokers had, but the differences were not statistically significant. They did, however, find a fairly strong relationship between smoking and inpatient hospital stays. For all hospital care, current smokers had 38% more hospitalizations than nonsmokers. We should reiterate, however, that the 1992 Worldwide Survey's sample was younger than Manning's sample, and health problems due to heavy smoking are more likely to show up in an older population.

Those authors found similar results using the NHIS data. There was little relationship between smoking and outpatient use, but there was a significant positive relationship between smoking and inpatient stays.

An earlier analysis by DoD focused on costs of smoking. The 1986 Department of Defense Smoking and Health Report presented findings based on data from medical

records indicating the number of days that beds in military hospitals were occupied (i.e., occupied bed days [OBDs]) due to conditions commonly attributed to smoking (DoD, 1986). Since not all cases of diseases commonly attributed to smoking are actually smoking-related, OBDs were adjusted downward by the percentage of all United States deaths from those conditions that the Surgeon General says can be directly attributed to smoking. The adjusted OBDs were multiplied by the average cost of an OBD to estimate the costs attributable to smoking. The resulting inpatient costs were estimated at $76.8 million in 1982, $84.6 million in 1983, and $77.0 million in 1984. Costs for these smoking-related diagnoses in military medical facilities (both inpatient and outpatient) in 1984 were estimated at $158.6 million.

However, the costs from the 1986 Report were not limited to active duty personnel. Costs included those for active personnel, retirees, dependents of active duty personnel, and dependents of retirees. This analysis showed that active duty personnel accounted for only a small portion of the costs. In 1982, less than 15% of OBDs used to compute the cost estimate were for active duty personnel.

8.2 Analytical Approach

We used the responses from questions about the use of alcohol and cigarettes, and questions about use of selected medical services, to estimate some of the medical costs of treating active duty heavy drinkers, active duty heavy cigarette smokers, and all other active duty personnel excluding heavy drinkers and heavy smokers. In our methodology, we first estimated the average number of selected medical services used by active duty military personnel in different substance use categories. Next, we multiplied the average number of services used per person by the average cost per unit of medical service to obtain the average cost per person for each different substance use category. We then multiplied the costs per person in each substance use category by the number of active duty military personnel in each category to obtain the total costs for each category. The sum of the total costs for each substance use category was the total medical costs of the selected Services. We estimated the incremental medical costs attributable to heavy drinking and smoking by the difference between the costs of providing medical services to an active duty population including heavy users and the hypothetical costs of providing medical services to an active duty population without heavy users. The second population would still include the same personnel, but the people who were formerly classified as heavy users would no longer be classified as such. They might have decreased their use of tobacco or alcohol below the "heavy" threshold or stopped using the products altogether.

An important consideration in our methodology is a potential cost bias introduced by the sampling frame and survey method. First, only active duty personnel were sampled. Retired or otherwise inactive personnel were not included. Since active duty personnel tend to be young, and some or many of the adverse health effects of smoking

are latent, many of the medical costs imposed by smoking will probably not have had sufficient time to manifest themselves. Further, personnel diagnosed with serious illnesses, such as lung cancer, who are unable to perform their duties, are given medical discharges. Therefore, personnel suffering from serious illnesses associated with smoking and drinking may not have been sampled due to their inactive status. Second, the survey method itself may introduce a kind of "healthy soldier bias." Specifically, active duty personnel selected for the survey who were on sick call at the time the survey was administered would not have been able to complete the questionnaire during the first phase of data collection. Instead, they would have been asked to complete the survey by mail rather than in person. Since the response rate for the mail-in respondents for the 1992 Worldwide Survey was significantly lower than the response rate for Phase 1 group sessions (see Table 2.1), the response rate for active duty personnel who were ill was probably lower than the response rate for personnel who were healthy enough to complete the questionnaire in person. The result that our sampling scheme likely missed persons with the highest costs and would have biased our cost estimates downward. Thus, our cost estimates must be considered very conservative in that they do not represent all medical costs attributable to heavy smoking and heavy drinking. Rather, they include costs primarily incurred by active duty personnel who were fit for duty.

We begin the analysis below by examining descriptive statistics. We then describe how we used multivariate analyses to calculate the average use of services, and the medical costs per person. The remainder of the chapter describes the results of these calculations and summarizes their importance.

8.2.1 Descriptive Results

We begin by examining the prevalence of active duty personnel who were heavy drinkers (but not heavy smokers), heavy smokers (but not heavy drinkers), and heavy users of both substances. Recall that we defined a heavy drinker as a person who drank at least 5 drinks per typical drinking occasion at least once a week and a heavy smoker as a person who smoked at least a pack of cigarettes a day.

Table 8.1 shows that 10.3% of active duty military personnel in 1992 were heavy drinkers only, 13.2% were heavy smokers only, and 4.8% were heavy users of both substances. The Marine Corps (18.3%) had the highest prevalence of heavy drinking only and the Air Force had the lowest prevalence (7.5%). The highest and lowest prevalences of heavy smokers only were in the Navy (15.5%) and Air Force (11.4%), respectively. Overall, the Marine Corps had the highest combined prevalence of heavy drinking or heavy smoking, with 39.0% reporting either heavy drinking only, heavy smoking only, or both. Conversely, the Air Force had the lowest combined prevalence of heavy drinking or heavy smoking (22.1%).

Table 8.1 Estimated Percentages of Heavy Drinkers and Heavy Smokers

Substance Use	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Heavy drinking only	11.5 (1.1)	8.9 (0.8)	18.3 (1.4)	7.5 (0.5)	10.3 (0.5)
Heavy smoking only	12.6 (0.8)	15.5 (0.7)	13.7 (1.0)	11.4 (0.8)	13.2 (0.4)
Heavy drinking and heavy smoking	5.5 (0.8)	5.0 (0.8)	7.0 (1.5)	3.2 (0.5)	4.8 (0.4)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	70.5 (1.5)	70.6 (0.9)	61.1 (1.9)	77.9 (1.3)	71.6 (0.7)

Note: Table entries are percentages (with standard errors in parentheses). Columns may not sum to 100% due to rounding. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.2 reports the frequency of hospitalizations and emergency room visits among active duty military personnel in the past year. For the most part, if someone reported having any visits/stays, they reported only one. Of all active duty military personnel, 93.6% reported no short hospitalizations, 5.5% reported one short hospitalization, and 1.0% reported more than one. Less than 4% of all active duty military personnel were hospitalized for a week or longer. Emergency room use was considerably more prevalent than either short or extended hospital stays, with 28.6% (equal to 100 minus the percentage of personnel with zero visits) of active duty DoD personnel having used an emergency room at least once in the past year.

Across the Services, there was some variability in emergency room visits but less in hospital stays. Approximately 30% of all active duty personnel used an emergency room at least once in the past year, with a high of 35.0% in the Air Force and a low of 22.2% in the Navy. The frequency of short hospital stays had a narrower range across Services, with the maximum prevalence at 7.8% in the Army and the minimum at 4.5% in the Navy. The distribution of extended hospital stays also had a narrow range across Services with the highest percentage of use being 5.1% in the Army compared to 3.0% in the Air Force.

For those active duty personnel who did report one or more overnight hospital stays during the 12-month reporting period, Table 8.3 describes the purposes of those stays. Surgery was by far the leading reason for hospitalization among all active duty

Table 8.2 Frequency of Hospital Use by Active Duty Personnel, Past 12 Months

Hospital Use	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Emergency Room Use										
0	69.1	(1.2)	77.8	(1.2)	76.7	(1.7)	65.0	(2.7)	71.4	(1.2)
1	18.7	(0.9)	15.6	(1.1)	16.2	(1.5)	21.4	(1.6)	18.3	(0.7)
2	6.6	(0.5)	4.3	(0.5)	3.3	(0.5)	7.6	(0.9)	5.9	(0.3)
3	2.8	(0.4)	1.3	(0.5)	2.3	(0.8)	3.4	(0.6)	2.5	(0.3)
4 or more	2.8	(0.4)	0.9	(0.3)	1.4	(0.6)	2.6	(0.3)	2.0	(0.2)
Hospitalizations,* Less Than 1 Week										
0	92.2	(0.9)	95.5	(0.7)	95.3	(1.1)	92.3	(0.6)	93.6	(0.5)
1	6.2	(0.7)	3.8	(0.5)	4.6	(1.1)	6.9	(0.6)	5.5	(0.4)
2	0.9	(0.2)	0.4	(0.2)	0.1	(**)	0.6	(0.2)	0.6	(0.1)
3	0.4	(0.2)	**	(**)	**	(**)	0.1	(0.1)	0.2	(0.1)
4 or more	0.3	(0.2)	0.2	(0.1)	**	(**)	0.1	(0.1)	0.2	(0.1)
Hospitalizations, 1 Week or Longer										
0	94.9	(0.5)	96.8	(0.5)	96.9	(0.5)	97.0	(0.3)	96.3	(0.3)
1	4.2	(0.5)	2.7	(0.4)	2.3	(0.6)	2.6	(0.3)	3.1	(0.2)
2	0.6	(0.2)	0.2	(0.1)	0.4	(0.3)	0.3	(0.1)	0.4	(0.1)
3	0.1	(0.1)	0.2	(0.1)	**	(**)	**	(**)	0.1	(**)
4 or more	0.2	(0.1)	0.2	(0.1)	0.3	(0.3)	**	(**)	0.2	(0.1)
Hospitalizations, Total										
0	86.1	(1.0)	90.5	(1.1)	91.8	(1.3)	89.2	(0.7)	88.9	(0.5)
1	11.0	(0.9)	8.2	(0.9)	6.7	(1.3)	9.5	(0.6)	9.3	(0.4)
2	1.6	(0.2)	0.6	(0.3)	1.1	(0.2)	1.0	(0.2)	1.1	(0.1)
3	0.6	(0.2)	0.2	(0.1)	0.1	(**)	0.2	(0.1)	0.3	(0.1)
4 or more	0.6	(0.2)	0.4	(0.2)	0.3	(0.3)	0.1	(0.1)	0.4	(0.1)

Note: Table entries are percentages (standard errors in parentheses). Columns may not sum to 100% due to rounding. Estimates have not been adjusted for sociodemographic differences among Services.

*Data on hospitalizations do not include emergency room use.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992

Table 8.3 Purpose of Hospitalization for Active Duty Personnel, Past 12 Months

Reason	Service								Total DoD (N=1,537)	
	Army (N=556)		Navy (N=340)		Marine Corps (N=174)		Air Force (N=467)			
Diagnostic tests	20.6	(2.8)	22.8	(5.1)	13.4	(2.6)	19.1	(1.6)	20.2	(1.8)
Physical illness	36.2	(3.1)	23.2	(2.9)	31.2	(4.2)	34.2	(2.7)	31.9	(1.8)
Injury	32.6	(2.9)	33.0	(3.1)	33.5	(5.2)	18.4	(2.7)	28.9	(1.7)
Delivery of baby	15.7	(2.7)	14.1	(2.8)	4.4	(1.7)	10.3	(1.8)	12.9	(1.4)
Surgery	49.6	(3.5)	38.8	(8.1)	49.1	(5.4)	56.4	(3.3)	48.8	(2.8)
Psychiatric treatment	5.2	(1.4)	4.3	(2.1)	3.9	(1.8)	4.5	(1.8)	4.7	(1.0)
Substance abuse treatment	2.8	(1.3)	6.5	(3.1)	10.6	(4.2)	3.4	(1.1)	4.5	(1.1)
STD treatment	2.2	(1.2)	13.1	(5.8)	0.6	(0.1)	1.0	(0.6)	4.5	(1.8)

Note: Entries are percentages (with standard errors in parentheses). Data are expressed as percentages of personnel who were hospitalized in the past year who reported specific reasons for hospitalization. N's are unweighted counts of respondents in each Service and the total DoD on whom the estimates are based. Percentages do not add to 100% because respondents could report more than one reason for hospitalization. Estimates have not been adjusted for sociodemographic differences among Services.

STD = Sexually transmitted disease.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992

personnel. Nearly half (48.8%) of all active duty personnel who were hospitalized reported it as a reason. Substance abuse treatment and treatment of sexually transmitted diseases were the least common reasons for hospitalization, with 4.5% being hospitalized for either of these reasons.

Similar to Table 8.2, Table 8.4 indicates the frequency of the use of selected outpatient services. For the total DoD we found that visits to military doctors were the most common, with 66.4% of active duty personnel reporting at least one visit; specialist visits were next with 26.1% having had at least one visit to a specialist in the past year.

The pattern of military doctor visits differed from the patterns we observed for hospitalization and emergency room use. First, the percentages with no visits to a

Table 8.4 Frequency of Use of Outpatient Services by Active Duty Personnel, Past 12 Months

Medical Service	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
General Physician Visits (Military)										
0	37.0	(1.4)	33.2	(2.2)	39.1	(3.3)	28.2	(0.9)	33.6	(0.9)
1	32.6	(0.7)	39.0	(3.1)	37.9	(1.4)	32.3	(1.2)	35.0	(1.0)
2	9.8	(0.8)	9.8	(0.8)	7.5	(1.0)	12.5	(0.6)	10.3	(0.4)
3	7.0	(0.7)	6.9	(0.8)	6.4	(0.8)	10.3	(0.4)	7.8	(0.3)
4 or more	13.7	(0.7)	11.1	(1.7)	9.0	(1.1)	16.8	(0.8)	13.3	(0.7)
General Physician Visits (Civilian)										
0	93.0	(0.8)	91.4	(0.5)	95.1	(0.7)	93.2	(1.0)	92.8	(0.4)
1	4.0	(0.4)	5.8	(0.4)	2.8	(0.6)	3.8	(0.5)	4.4	(0.3)
2	0.9	(0.2)	0.7	(0.1)	1.1	(0.5)	1.1	(0.2)	0.9	(0.1)
3	0.7	(0.2)	0.9	(0.3)	0.4	(0.3)	0.8	(0.2)	0.7	(0.1)
4 or more	1.3	(0.3)	1.2	(0.3)	0.5	(0.3)	1.1	(0.3)	1.2	(0.1)
Medical Specialist Visits										
0	72.1	(1.2)	77.0	(1.1)	79.3	(1.4)	70.4	(1.1)	73.9	(0.7)
1	11.2	(0.8)	9.2	(1.0)	8.2	(1.3)	12.8	(0.6)	10.7	(0.5)
2	6.2	(0.5)	5.0	(0.6)	4.2	(0.6)	6.6	(0.4)	5.7	(0.3)
3	3.5	(0.3)	2.4	(0.3)	2.4	(0.6)	3.4	(0.4)	3.1	(0.2)
4 or more	7.0	(0.6)	6.4	(0.7)	5.9	(0.8)	6.8	(0.6)	6.6	(0.3)

Note: Table entries are percentages (standard errors in parentheses). Columns may not sum to 100% due to rounding. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992

military physician and one visit were approximately equal. For the total DoD, 33.6% of active duty personnel reported no visits, compared to 35.0% with one visit. Second, the percentages did not drop off after only one visit as they did for hospitalizations and emergency room use. In fact, in the total DoD and in all four Services, the percentage of active duty personnel with four or more visits was higher than the percentages with either two visits or three visits.

The overwhelming majority of the active duty military personnel had no visits to a civilian doctor in the past year. If they did have a visit, it was likely to be just one. For the total DoD, 7.2% reported that they had visited a civilian doctor. This is not surprising since medical care at military facilities is a well-known military benefit for active duty military personnel.

The distribution of specialist visits was similar to the military doctor visit pattern in that the percentage that reported four or more was always higher than the percentage that reported two or three visits. In each Service, 20 to 30% of active duty personnel reported at least one specialist visit. For the total DoD, 73.9% reported no visits, 10.7% reported one visit, and 15.4% reported two or more visits. Once again, the nature of the disorders associated with visiting a specialist may account for this pattern of results.

Table 8.5 reports reasons for doctor visits. Of the three leading reasons for doctor visits in the DoD, 66.0% reported visiting a doctor to get a physical, 57.8% for treatment of a physical illness, and 40.5% for treatment of an injury. Substance abuse treatment or counseling was reported the least often among all active duty military personnel who had a doctor visit (1.7%) in the total DoD and in all four Services.

Tables 8.6 and 8.7 report average numbers of emergency room visits, hospital stays, and selected outpatient visits by active duty personnel in various substance use categories. Table 8.6 reports, for example, that heavy smokers in the total DoD (who were not heavy drinkers) averaged 53 emergency room visits per 100 people in this substance use category. A number of the estimates have high standard errors because of the low number of observations in individual cells. Similar results are apparent in Table 8.7. Because so many of these estimates are imprecise, they cannot themselves be used to estimate medical costs attributable to alcohol and tobacco use.

An additional and important limitation associated with using just these sample averages to compute costs attributable to heavy drinking and smoking is that there may be many confounding variables that are not controlled for in these averages. Factors such as age and sex are not held constant across different levels of alcohol and tobacco use. Further, there are age differences across the different Services; for example, the Air Force has a higher percentage of older personnel (Table 2.4). Therefore, the results may reflect differences in age or sex. A simple average from the sample will not allow us to control for these different correlates. Multivariate analysis, on the other hand, allows us to control for a host of respondent characteristics besides alcohol and tobacco use that may influence medical resource use, such as sex, age, education, race/ethnicity, and participation in Operation Desert Shield/Desert Storm.

8.2.2 Multivariate Analysis

We formulated a model that relates active duty military personnel's use of selected medical services such as emergency room visits, hospital stays, and doctor visits to independent variables such as sex, age, race/ethnicity, and whether the respondent was a heavy drinker or heavy smoker. We examined two possible impacts of substance abuse on medical care services received. We examined the impact of heavy alcohol and tobacco use on any use of a particular medical service, as well as the impact of heavy alcohol and

Table 8.5 Purpose of Doctor Visits by Active Duty Personnel, Past 12 Months

Reason	Service								Total DoD (N=12,996)	
	Army (N=3,714)		Navy (N=3,124)		Marine Corps (N=1,961)		Air Force (N=3,714)			
Routine checkup or physical	62.9	(1.0)	70.0	(2.1)	68.8	(2.5)	64.1	(1.2)	66.0	(0.9)
Physical illness	56.4	(1.2)	54.9	(3.1)	52.4	(2.9)	64.0	(1.4)	57.8	(1.1)
Injury	48.8	(1.8)	37.9	(0.7)	48.9	(0.8)	32.1	(1.0)	40.5	(0.7)
Medical care before or after the delivery of baby	3.5	(0.5)	3.6	(0.4)	1.0	(0.2)	2.3	(0.3)	2.9	(0.2)
Medical care related to surgery	12.2	(0.7)	9.6	(1.4)	8.3	(0.5)	13.4	(0.9)	11.4	(0.6)
Mental health services or counseling	6.9	(0.8)	5.8	(0.7)	5.4	(1.2)	7.0	(0.5)	6.4	(0.4)
Substance abuse treatment or counseling	1.7	(0.4)	1.1	(0.2)	3.1	(0.4)	1.5	(0.3)	1.6	(0.2)
STD treatment	4.6	(0.7)	6.5	(0.9)	10.6	(2.7)	4.1	(0.5)	5.7	(0.5)

Note: Entries are percentages (with standard errors in parentheses). Data are expressed as percentages of personnel who visited a doctor in the past year who reported specific reasons for visiting a doctor. N's are unweighted counts of respondents in each Service and the total DoD on whom the estimates are based. Percentages do not add to 100% because respondents could report more than one reason for visiting a doctor. Estimates have not been adjusted for sociodemographic differences among Services.

STD = Sexually transmitted disease.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.6 Average Numbers of Hospital Services Provided to Active Duty Personnel, Past 12 Months

Medical Service/ Substance Use	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Emergency room visits					
Heavy drinkers only	60 (7)	42 (10)	43 (7)	60 (5)	52 (4)
Heavy smokers only	56 (6)	34 (4)	7 (3)	71 (9)	53 (5)
Heavy drinkers and heavy smokers	63 (13)	33 (9)	68 (20)	61 (15)	54 (7)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	69 (7)	34 (4)	32 (5)	63 (6)	53 (3)
Total (all active duty personnel)	66 (5)	34 (4)	41 (4)	64 (6)	53 (3)
Short hospital stays (less than 1 week)					
Heavy drinkers only	8 (3)	+ (+)	6 (2)	13 (4)	13 (6)
Heavy smokers only	6 (2)	6 (1)	8 (3)	8 (2)	7 (1)
Heavy drinkers and heavy smokers	11 (2)	+ (+)	8 (3)	+ (+)	8 (2)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	14 (5)	6 (2)	+ (+)	8 (1)	9 (2)
Total (all active duty personnel)	12 (3)	8 (3)	5 (1)	9 (1)	9 (1)
Extended hospital stays (1 week or longer)					
Heavy drinkers only	5 (2)	4 (2)	+ (+)	+ (+)	8 (4)
Heavy smokers only	8 (2)	3 (1)	5 (2)	4 (1)	5 (1)
Heavy drinkers and heavy smokers	12 (5)	+ (+)	** (**)	6 (2)	6 (2)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	11 (5)	6 (1)	4 (2)	4 (1)	7 (2)
Total (all active duty personnel)	10 (4)	5 (1)	5 (1)	5 (2)	7 (1)

Note: Data are expressed as mean numbers of services per 100 people per year (standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.7 Average Numbers of Outpatient Services Provided to Active Duty Personnel, Past 12 Months

Medical Service/ Substance Use	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
General physician visits (military)					
Heavy drinkers only	172 (40)	96 (30)	143 (34)	210 (52)	155 (20)
Heavy smokers only	226 (32)	197 (31)	161 (23)	208 (22)	204 (16)
Heavy drinkers and heavy smokers	262 (52)	95 (34)	130 (24)	168 (25)	172 (24)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	178 (13)	144 (16)	95 (11)	219 (17)	173 (9)
Total (all active duty personnel)	188 (12)	146 (15)	115 (12)	215 (15)	175 (8)
General physician visits (civilian)					
Heavy drinkers only	12 (4)	11 (4)	19 (6)	+ (+)	17 (4)
Heavy smokers only	26 (11)	+ (+)	+ (+)	16 (5)	28 (11)
Heavy drinkers and heavy smokers	+ (+)	+ (+)	16 (7)	+ (+)	20 (6)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	27 (6)	29 (8)	7 (3)	18 (4)	23 (3)
Total (all active duty personnel)	25 (5)	29 (6)	10 (2)	18 (5)	23 (3)
Outpatient specialist visits					
Heavy drinkers only	103 (20)	76 (36)	71 (14)	81 (20)	85 (13)
Heavy smokers only	123 (19)	140 (33)	84 (33)	101 (20)	120 (14)
Heavy drinkers and heavy smokers	126 (25)	+ (+)	211 (82)	49 (10)	99 (22)
All other active duty personnel (excluding heavy drinkers and heavy smokers)	113 (15)	87 (10)	74 (10)	110 (9)	101 (6)
Total (all active duty personnel)	114 (11)	92 (9)	84 (11)	105 (8)	102 (5)

Note: Data are expressed as mean numbers of services per 100 people per year (standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

tobacco use on the amounts of the services they used--conditional upon any use. The regression results from the latter suggested that heavy use of either alcohol or tobacco did not affect the amount of medical services that were used. Consequently, we focused on the discrete outcome--whether a person used the service.

We specified a logistic regression model for each of the six medical services being considered: emergency room visits, short hospital stays (less than one week), extended hospital stays, physician visits to a general practitioner (military), physician visits to a general practitioner (civilian), and specialist visits. For ease of interpretation, the categorical variable "heavy smoking" was set equal to one if the respondent was a heavy smoker, and was set equal to zero otherwise; similarly, "heavy drinking" was set equal to one if the respondent was a heavy drinker, and was set equal to zero otherwise. If a respondent was both a heavy drinker and a heavy smoker, both of the categorical variables were set equal to one. With this specification, the results of the logistic models indicated the impact of heavy drinking on the probability of using medical services, holding constant whether or not the individual was a heavy smoker. Similarly, the results indicated the effect of being a heavy smoker on the probability of using medical services, holding constant whether or not the individual was a heavy drinker. We estimated logistic regressions of the use/nonuse of the six medical services. Parameter estimates from these regressions are presented in Table F.11 in Appendix F.

Two parameter estimates for the substance abuse variables were statistically significant ($p < .05$): the effect of heavy smoking on military physician visits, and the effect of heavy drinking on civilian physician visits. No other estimates relating smoking and drinking to uses of medical services were statistically significantly different from zero. These results indicate that heavy smokers were significantly more likely than active duty personnel who were not heavy smokers to see a military doctor. Also, heavy drinkers were significantly more likely than other drinkers or abstainers to see a civilian doctor. (Since medical expenses paid by active duty personnel to civilian doctors are frequently reimbursable by CHAMPUS, these still represent costs to the DoD.) Since heavy alcohol and tobacco use significantly affected only the probability of visiting a military or civilian general practitioner, our estimates of the total costs consider the impact of heavy smoking and heavy drinking on the use of these two services only.

8.2.3 Computation of Average Use of Physician Services

Using the regression results, we computed the probabilities of visiting both civilian physicians and military physicians. We computed two probabilities for each medical service--one for a heavy smoker or heavy drinker and one for anyone who was not a heavy drinker or heavy smoker. We then multiplied the estimated probability of use for each substance use group by the relevant sample average number of services, conditional on any use, to create the average use of medical services per person (Kenkel, 1990). For

example, if the probability of a heavy drinker visiting a civilian physician in the past year was 0.5 and the sample average number of services--conditional upon any use--was two per person, then the average number of civilian physician visits in the past year for a heavy drinker was one per person. These averages can be interpreted as the expected number of visits for people with a given substance use condition.

8.2.4 Computation of Average Costs Per Person

In order to compute the cost estimates, we first acquired estimates of the average costs of civilian physician visits and military physician visits (S. Olson, Office of the Assistant Secretary of Defense [Health Affairs], personal communication, June 1992). The resulting figures can be seen in Table 8.8. The average cost of a visit to a civilian physician was set at $70, and the cost of a visit to a general practitioner at a military facility was set at $63.

Table 8.8 1990 Costs of Medical Services

Service	Cost
General physician visit (military)[a]	$63
General physician visit (civilian)[b]	$70

[a]Commander Steve Olson, Office of the Assistant Secretary of Defense, Health Affairs, June 1992.

[b]U.S. Dept. of Health and Human Services, Visits to selected health care practitioners, February 1986, p. 25. (Adjusted to 1990 dollars: U.S. Bureau of Census, Statistical Abstract of the United States: 1991 (111th edition), Washington, DC, 1991.)

To calculate the average costs per active duty person, we multiplied the average use of medical services by the average cost of each medical service. For example, if the average number of civilian physician visits in the past year for heavy drinkers was 0.5 per person, and the average cost of a civilian physician visit was $70, the estimated cost of a civilian physician visit per heavy drinker was $35.

8.2.5 Computation of Cost to the Military

The final step in the cost calculation was to extrapolate the per person costs to the DoD population. We multiplied each cost per person by the number of active duty personnel in the relevant subpopulation. For example, multiplying the cost per heavy smoker in the DoD by the number of active duty heavy smokers in the DoD resulted in the costs to the military for all heavy smokers. Recall that the cost of heavy smokers included the normal, non-smoking-related medical costs, plus the incremental costs of heavy smoking.

8.3 Estimated Costs of Heavy Drinking and Heavy Smoking by Active Duty Personnel in the DoD

As noted above, we included in our calculations only the medical care services that were significantly affected by heavy smoking and heavy drinking. Heavy smokers were significantly more likely to visit a military doctor, and heavy drinkers were significantly more likely to visit a civilian doctor. Thus, the following estimates relate only the effect of heavy smoking and heavy drinking on the costs of civilian and military physician visits.

8.3.1 Estimates of Physician Visits

Table 8.9 displays our estimates of the predicted number of civilian physician and military physician visits per 100 people per year by heavy smokers and heavy drinkers. For example, heavy drinkers in the DoD would be expected to have 26.71 civilian physician visits compared to 19.72 visits for all other active duty personnel (excluding heavy drinkers).

A few interesting observations can be drawn from this table. In each service, and in the DoD as a whole, heavy drinkers would be expected to have more civilian physician visits, and heavy smokers would be expected to have more military physician visits than all other active duty personnel (excluding heavy drinkers and heavy smokers), without exception. Finally, military physician visits would be more prevalent than civilian physician visits.

8.3.2 Estimates of the Costs Per Person

Table 8.10 displays the predicted costs of military physician visits and civilian physician visits for heavy smokers, heavy drinkers, and all other active duty personnel (excluding heavy smokers and drinkers). For example, we calculated the civilian physician cost per heavy drinker in the DoD ($18.70) by taking the estimated number of visits per 100 people in Table 8.9 (26.71) and dividing by 100 to get the estimated number of visits per person (0.2671); and then multiplying that number by the average cost per service in Table 8.8 ($70).

The costs of caring for heavy alcohol users and tobacco users were greater than the costs for all other active duty personnel (excluding heavy drinkers and heavy smokers). For example, in the total DoD, military physician visits cost $118.50 per heavy smoker per year and $110.02 for all other active duty personnel (excluding heavy smokers).

Table 8.9 Predicted Visits Per 100 People Per Year, Active Duty Personnel

Medical Service/ Smoking Status	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
General Physician Visits (civilian)					
Heavy drinkers only	29.99	34.39	11.77	22.04	26.71
All other active duty personnel (excluding heavy drinkers)	22.14	25.52	8.63	16.26	19.72
General Physician Visits (military)					
Heavy smokers only	202.42	155.67	124.23	228.66	188.10
All other active duty personnel (excluding heavy smokers)	186.30	144.66	113.60	214.95	174.63

Note: Predicted visits are based on logistic regression data to control for the effect of other variables (e.g., age, sex, etc.).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.10 Predicted Costs Per Person Per Year, Active Duty Personnel

Medical Service Cost/ Smoking Status	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
General physician visits (civilian)					
Heavy drinkers only	20.99	24.07	8.24	15.43	18.70
All other active duty personnel (excluding heavy drinkers)	15.50	17.87	6.04	11.38	13.81
General physician visits (military)					
Heavy smokers only	127.53	98.07	78.26	144.07	118.50
All other active duty personnel (excluding heavy drinkers)	117.37	91.14	71.57	135.42	110.02

Note: Predicted costs per person (in dollars) are based on logistic regression data to control for the effect of other variables (e.g., age, sex, etc.)

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

8.3.3 Estimates of the Cost to the Military

Tables 8.11, 8.12, and 8.13 report the predicted total costs (in millions of dollars per year) for heavy drinkers and all other active duty personnel; and for heavy smokers and all others for the total DoD and for each Service. These tables also show the incremental costs of selected medical services attributable to active duty heavy drinkers and smokers to the DoD and each Service. Each table describes two scenarios and the difference in total costs between them. The first scenario describes the current military situation. We calculated these estimates by multiplying the relevant per person cost estimates in Table 8.10 by the number of heavy alcohol users and heavy smokers in each Service. For example, the civilian physician visit cost per all other active duty personnel (excluding heavy drinkers) for the DoD would be $13.81 (Table 8.10). We multiplied this cost by the active duty population of the DoD (1,850,451) and the percentage of the DoD that could be classified as abstainers or non-heavy drinkers from Table 8.1 (84.9%; 100 minus the sum of rows 1 and 3) to obtain $21.7 million.

The second scenario describes the situation in which all of the heavy drinkers and smokers have been reclassified as active duty personnel who are not heavy users of either, thereby eliminating the incremental costs attributable to heavy drinking and smoking. The costs of all other active duty personnel (excluding heavy drinkers and smokers) do not change from Scenario 1 to 2, but the total costs do. The difference is that the heavy drinkers and heavy smokers in Scenario 1 are now no longer heavy drinkers and heavy smokers in Scenario 2, and their costs are smaller. In Scenario 1, the civilian physician costs of heavy drinkers in the DoD would be $5.2 million and in Scenario 2, the former heavy drinkers would cost only $3.8 million, as shown in Table 8.11. The incremental civilian physician costs in the DoD attributable to heavy drinking would be the total cost difference from Scenario 1 to 2, reported in the seventh row: $1.4 million. The final row in Table 8.11 shows the calculation of the percentage difference with respect to current civilian physician costs from Scenario 1. This is the percentage of current civilian physician costs attributable to active duty heavy drinkers, or 5.1% for the total DoD.

The total DoD columns in Tables 8.11, 8.12 and 8.13 contain the incremental medical costs to the DoD due to active duty heavy drinkers and smokers. The incremental cost estimates due to heavy drinking and smoking are $1.4 million, $2.8 million and $4.2 million for civilian physician visits, military physician visits, and total medical costs, respectively. (Note that these are not total military medical costs, but are costs only for active duty personnel who are fit for duty.) The final row in each table puts these estimates into perspective. As it turns out, $1.4 million is 5.1% of the total civilian physician costs (Table 8.11), $2.8 million is 1.4% of the military physician costs (Table 8.12), and $4.2 million is 0.3% of the total medical bill (Table 8.13).

Table 8.11 Predicted General Physician (Civilian) Costs Due to Heavy Drinkers, Active Duty Personnel

Scenario/Predicted Cost	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Scenario 1[a]					
Cost of heavy drinkers only	2.3	1.8	0.4	0.8	5.2
Cost of all other active duty personnel (excluding heavy drinkers)	8.4	8.2	0.8	4.9	21.7
Total cost[b]	10.7	10.0	1.2	5.7	26.9
Scenario 2[c]					
Cost of *former* heavy drinkers only	1.7	1.3	0.3	0.6	3.8
Cost of all other active duty personnel (excluding heavy drinkers)	8.4	8.2	0.8	4.9	21.7
Total cost[d]	10.1	9.5	1.1	5.5	25.5
Difference in total cost from Scenario 1 to 2[e]	0.6	0.5	0.1	0.2	1.4
Percentage difference[f]	5.7%	4.6%	8.4%	3.7%	5.1%

Note: Columns and rows may not sum correctly due to rounding. Predicted costs in millions of dollars/year are based on logistic regression data to control for the effect of other variables (e.g., age, sex, etc.).

[a]Military with current percentages of heavy and non-heavy drinkers.
[b]Sum of predicted costs for heavy drinkers and costs for all other active duty personnel.
[c]Military with 0% heavy drinkers.
[d]Sum of predicted costs for former heavy drinkers and costs for all other active duty personnel.
[e]Costs do not represent total military medical costs, only those for active duty personnel who were fit for duty.
[f]Difference in total cost divided by total costs in Scenario 1.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.12 Predicted Military Doctor Costs Due to Heavy Smokers, Active Duty Personnel

Scenario/Predicted Cost	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Scenario 1[a]					
Cost of heavy smokers only	15	10.7	3.0	10.2	39.5
Cost of all other active duty personnel (excluding heavy smokers)	62.7	38.5	10.4	56.0	166.9
Total cost[b]	77.7	49.2	13.4	66.2	206.4
Scenario 2[c]					
Cost of former heavy smokers only	13.8	9.9	2.7	9.6	36.7
Cost of all other active duty personnel (excluding heavy smokers)	62.7	38.5	10.4	56.0	166.9
Total cost[d]	76.5	48.4	13.1	65.6	203.6
Difference in total cost from Scenario 1 to 2[e]	1.2	0.8	0.3	0.6	2.8
Percentage difference[f]	1.5%	1.5%	1.9%	0.9%	1.4%

Note: Columns and rows may not sum correctly due to rounding. Predicted costs in millions of dollars/year are based on logistic regression data to control for the effect of other variables (e.g., age, sex, etc.)

[a]Military with current percentages of heavy and nonheavy smokers.
[b]Sum of predicted costs for heavy smokers and costs for all other active duty personnel.
[c]Military with 0% heavy smokers.
[d]Sum of predicted costs for former heavy smokers and costs for all other active duty personnel.
[e]Costs do not represent total military medical costs, only those for active duty personnel who were fit for duty.
[f]Difference in total costs divided by Scenario 1 total costs.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 8.13 Predicted Medical Costs Due to Heavy Smokers and Drinkers, Active Duty Personnel

Scenario/Predicted Cost	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Scenario 1[a]					
Cost of heavy smokers and drinkers only	197.3	93.0	37.1	71.3	398.7
Cost of all other active duty personnel (excluding heavy drinkers and heavy smokers)	498.9	240.3	64.1	273.3	1,076.6
Total medical costs[b]	696.2	333.3	101.2	344.6	1,475.3
Scenario 2[c]					
Cost of *former* heavy smokers and drinkers only	195.5	91.7	36.8	70.5	394.5
Cost of all other active duty personnel (excluding heavy drinkers and heavy smokers)	498.9	240.3	64.1	273.3	1,076.6
Total medical costs[d]	694.4	332.0	100.9	343.8	1,471.1
Difference in total cost from Scenario 1 to 2[e]	1.8	1.2	0.4	0.8	4.2
Percentage difference[f]	0.3%	0.4%	0.4%	0.2%	0.3%

Note: Costs in millions of dollars per year include predicted costs of other medical services: emergency room visits, short and long hospital stays, and visits to specialists. The average costs per unit of service used to calculate total costs were: emergency room visit, $102; short hospital stay, $1,970; long hospital stay, $5,630; and specialist visit $78 (Olson, 1992). Columns and rows may not sum correctly due to rounding. Predicted costs are based on logistic regression data to control for the effect of other variables (e.g., age, sex, etc.)

[a]Military with current percentages of heavy drinkers and heavy smokers.
[b]Sum of predicted costs for heavy drinkers, heavy smokers, and all other active duty personnel.
[c]Military with 0% heavy smokers and drinkers.
[d]Sum of predicted costs for former heavy drinkers, former heavy smokers, and all other active duty personnel.
[e]Costs do not represent total military medical costs, only those for active duty personnel who were fit for duty.
[f]Difference in total costs divided by Scenario 1 total costs.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

These rather modest estimates must be interpreted with caution, as total costs to DoD associated with heavy alcohol and cigarette use may still be substantial. This analysis examined only a very limited aspect of potential costs that may be associated with heavy drinking or heavy smoking. In particular, we did not examine costs due to increased absenteeism, diminished productivity, or property damage that might be attributable to alcohol use or careless use of cigarettes.

In addition, our estimates were restricted to active duty personnel who were fit for duty and were based on respondents' reported use of services. Cost data were not included data from other sources (e.g., hospital discharge summaries or outpatient encounter forms), or from other populations served by the military medical system (e.g., retirees or dependents who use a military facility) that are likely to show additional medical costs for DoD associated with heavy alcohol or cigarette use. However, the fact that we detected some increased medical costs attributable to heavy drinking and heavy smoking among the generally young and healthy active duty population indicates that these personnel were already beginning to experience some negative health consequences associated with their use of these substances.

8.4 Summary

This chapter explored the relationship between the use of selected medical services (i.e., doctor visits, emergency room visits, and hospital stays) by active duty military personnel and their heavy use of alcohol and cigarettes. The major findings are summarized below:

- Regression results indicated that heavy smokers were significantly more likely than personnel who were not heavy smokers to see a general practitioner at a military facility (188 visits per 100 people per year vs. 175 visits, respectively).
- Heavy drinkers were also significantly more likely to see a civilian doctor than were other drinkers or abstainers (27 visits per 100 people per year vs. 20 visits, respectively).
- Relationships between heavy drinking, heavy smoking, and the use of other medical services (most notably emergency room visits and hospital stays) were not statistically significant.

  [Cost estimates reported in the next three bullets are not total medical costs for the DoD].

- The estimated annual incremental cost imposed on DoD of "excess" military physician visits by active duty heavy smokers was $2.8 million.
- The estimated annual incremental cost imposed on DoD of "excess" civilian doctor visits by active duty heavy drinkers was $1.4 million.
- The increased costs for selected medical services due to the "excess" use by active duty heavy drinkers and smokers, $4.2 million, was a fairly modest (0.3%) share of the total annual active duty medical costs incurred by DoD.

As stated above, analysts should not necessarily conclude from these results that the costs to the military associated with heavy drinking and heavy smoking are minimal or inconsequential. It is important to recall the narrow focus of these cost estimates. First, we surveyed only active duty personnel who were fit for duty. Thus, our cost estimates reflect the increased use of medical services only by only active duty heavy smokers and drinkers. The estimates likely would be much higher were we to include others served by military health care facilities, such as retirees and dependents. The addition of retirees, especially, would likely have a large effect due to the latent nature of illnesses associated with heavy smoking and drinking.

Second, we estimated the cost of increased use of selected medical services. Pharmaceutical services, home medical care services, and substance abuse services are among those medical costs not estimated. Further, we did not attempt to measure costs due to productivity loss, absenteeism, property damage, or other possible costs associated with heavy smoking or heavy drinking.

Finally, the sample frame and survey method may have created a "healthy soldier" bias that underestimated the cost of heavy smoking and heavy drinking. Personnel who were seriously ill and, hence, using the most medical resources, had probably been removed from active duty (and thus fell outside the scope of the sampling frame for the survey). Personnel who were on sick call at the time of the survey were probably less likely to respond to the survey.

Despite these limitations, we still detected increased medical costs attributable to heavy alcohol use and heavy smoking among this generally young and healthy population. This suggests that active duty military personnel were already beginning to experience negative health consequences associated with their use of these substances.

9. MILITARY ALCOHOL, OTHER DRUG, AND TOBACCO POLICIES AND PROGRAMS

Over the past two decades, the Department of Defense has mounted a series of policy directives and programs designed to detect, prevent, and reduce alcohol and other drug abuse and more recently to discourage smoking among military personnel. While the DoD provides overall policy guidance, it is the responsibility of the individual Services to tailor specific programs to meet the needs of their personnel. This chapter traces the development of DoD policies and programs on substance use and examines 1992 perceptions of military personnel about the nature and scope of the problem in the Services and the effectiveness of Service-specific programs and policies in coping with the problem.

9.1 The Evolution of DoD and Services Policies and Programs on Alcohol and Other Drug Abuse and Tobacco Use

The DoD formed a task force in 1967 in response to reports of widespread drug abuse among troops in Vietnam. Although the task force was especially concerned about ways to prevent and treat drug abuse in the military, Senator Harold Hughes led the Congress to specify that alcohol be accorded equal emphasis in the DoD's drug program development efforts. Recommendations from that 1967 task force led to a drug and alcohol abuse policy focusing on prevention, education, and law enforcement practices directed at detection and early intervention (NIAAA, 1982).

Title V of the 1971 P.L. 92-129 (the Military Selective Service Act) required that a program be developed to identify and treat alcohol- and drug-dependent military personnel. By mandate of the Secretary of Defense, each Service then developed its own prevention and treatment programs responsive to its personnel needs and circumstances yet in compliance with the Title V guidelines.

Emphasizing the significance of the alcohol abuse problem in the Services, the DoD issued a policy directive in 1972 (No. 1010.2) that set forth prevention and treatment policies for alcohol abuse and alcoholism among military personnel. Although the directive addressed prevention and education and treatment, it also emphasized detection and enforcement. In instances in which individuals fail to respond to rehabilitative interventions, the directive specifies provisions for returning such personnel to civilian life (NIAAA, 1982).

The DoD policy directive of 1980 (No. 1010.4) superseded the 1972 directive and reflected a tougher, less tolerant, and more results-oriented stance toward alcohol and drug abuse than did previous policy initiatives. This directive established as DoD goals

becoming "free of the effects of alcohol and drug abuse" and of possession, trafficking, use, sale, or promotion of illicit drugs and drug abuse paraphernalia (p. 2). Since the DoD views drug and alcohol abuse as a threat to high performance standards and combat readiness, it has established a multifaceted policy that addresses the problem from a more comprehensive perspective than previous policy directives. Specifically, the 1980 drug and alcohol abuse policy directive states that the DoD will not only detect, treat, and to the extent possible, rehabilitate drug and alcohol abusers, but also will work to prevent abuse. Preventive measures include prohibiting the possession, sale, or trafficking of drugs and drug abuse paraphernalia; detecting and refusing admission to drug- and alcohol-dependent inductees or DoD civilian job candidates; providing education and training to commanders, supervisors, program personnel, and other military members and civilian employees and their families concerning alcohol and drug abuse and measures to address the problem; and working with other national government and nongovernment alcohol and drug abuse prevention efforts (DoD Directive No. 1010.4, pp. 2-3).

In addition to establishing policies aimed at reducing drug and alcohol abuse, DoD has also given recent emphasis to smoking prevention and cessation. In 1986, the DoD issued a directive on health promotion (DoD Directive No. 1010.10) that included a focus on reducing tobacco use, along with another on alcohol and other drug abuse prevention as two of the areas to be covered. The aims of smoking prevention and cessation programs are to (a) create a social environment that supports abstinence and discourages use of tobacco products, (b) create a healthy working environment, and (c) provide smokers with encouragement and professional assistance in quitting. To these ends, the military prohibits smoking in public places and common work areas and permits smoking only in those places where it will not endanger others. The Services incorporate information about smoking with information about alcohol and other drug abuse at entry and permanent change of station; at entry, the Services encourage nonsmokers to refrain from smoking. They also encourage smokers to quit and offer them assistance in quitting. Health educators also give information about smoking during routine physical examinations, and direct public education programs toward various target audiences.

Specific responsibility for developing, coordinating, and supervising the DoD alcohol and smoking prevention programs rests with the Assistant Secretary of Defense for Health Affairs. Responsibility for DoD drug abuse policy rests with the DoD coordinator for Drug Enforcement Policy and Support. Although the Office of the Secretary of Defense offers general policy guidance, policy implementation is the responsibility of the military Services. The major areas of policy focus are monitoring, deterrence and detection, treatment and rehabilitation, and education and training.

9.1.1 Monitoring

DoD policy is to monitor systematically the extent of alcohol and other drug abuse in the military, assess the impact of abuse on the military, and identify the factors responsible for changes in abuse rates. In order to assess changes in the extent of abuse, the DoD also monitors abuse rates in the general population as well as DoD program initiatives and policy changes. The goal of these monitoring activities is to enable the DoD to develop and modify programs and policies to target treatment and prevention efforts that will reduce the negative impacts of abuse on the military.

The DoD reports on findings from urinalysis drug testing, alcohol and drug education and treatment program activities, military law enforcement activities related to abuse, and legal or administrative disposition of drug abuse offenders. Additionally, DoD has implemented a system for capturing information on the scope of the abuse problem. The information is available upon request by governmental, Congressional, or public agencies and in support of budget requests for alcohol and other drug abuse treatment and prevention efforts (DoD Directive No. 1010.3). DoD policy on health promotion, which includes smoking prevention and cessation and alcohol and other drug abuse prevention, does not include specific reporting requirements but does require DoD to "coordinate and monitor relevant aspects of the health promotion program" (DoD Directive No. 1010.10, p. 3).

9.1.2 Deterrence and Detection

DoD has designed its deterrence and detection efforts to prevent the abuse of alcohol and the use of illicit drugs by military personnel, and to target abusers or those at high risk of abuse for education and early intervention efforts. As described in DoD Directive No. 1010.1, Drug abuse testing program, the DoD urine drug testing program is designed to deter Service members from using drugs and to allow commanders to evaluate the fitness of their charges to assume their military responsibilities and to meet acceptable standards of performance.

DoD encourages recruiters to identify and reject potential enlistees who have current abuse problems or histories of serious alcohol and other drug abuse. Urinalysis and alcohol breathalyzer tests on enlistees are conducted to screen out abusers. After induction, deterrence measures include having recruits read and sign documents that indicate they understand the DoD policy on substance use and having commanders conduct periodic, random urinalysis tests.

Drug and alcohol abuse may be deterred by detection practices. For example, law enforcement measures such as breathalyzers, blood tests, and drug detection dogs not only may detect abusers but also may prevent abuse if personnel believe that detection is likely. DoD Directive 1010.7, Drunk and drugged driving by DoD personnel, is designed

to prevent impaired driving and specifies that persons caught and convicted will have their driving privileges suspended. The directive specifies a coordinated program of education, detection, law enforcement, and treatment for the offender. Additionally, it specifies education and training for personnel who may encounter abusers, such as law enforcement, public information, and emergency room personnel; safety personnel; bartenders; waitresses; and sales personnel.

9.1.3 Treatment Interventions

The large DoD drug and alcohol treatment and rehabilitation program is tailored to individual needs and ranges from intensive education seminars to inpatient hospital care. As described in DoD Instruction No. 1010.6, Rehabilitation and referral services for alcohol and drug abusers, DoD's treatment goals are two-pronged: (a) to identify those at risk of abuse, and (b) to provide counseling and rehabilitative services through residential, nonresidential, consultative, and educational interventions. The treatment-rehabilitation services continuum includes, where appropriate, detoxification, family counseling, and aftercare. Individuals who have had their installation driving privileges revoked as a result of an impaired driving conviction (or refusal to take a blood alcohol concentration test) are required to participate in alcohol and drug awareness programs.

With regard to tobacco use, the DoD directive on health promotion requires installations to "assess the current resources, referral mechanisms, and need for additional smoking cessation programs" (DoD Directive No. 1010.10, p. 5).

9.1.4 Education and Training

A major component of the DoD alcohol and other drug abuse prevention program is the education and training that the Services provide both for abusers and for those responsible for supervising military personnel and treating abusers. As specified in DoD Instruction No. 1010.5, Education and training in alcohol and drug abuse prevention, the Services all offer military leadership and program supervisors instruction regarding DoD alcohol and other drug abuse programs and other resources. One goal of such activities is to improve the competence of personnel such as health care professionals and paraprofessionals, military commanders, military and civilian supervisors, and program personnel regarding DoD alcohol and other drug abuse prevention policy and effective strategies for deterring drug and alcohol abuse and its associated problems. Other members of the military receive appropriately tailored alcohol and other drug abuse education interventions.

DoD general health promotion efforts detailed in DoD Directive No. 1010.10 include smoking prevention and cessation and alcohol and other drug abuse prevention. Each of the Services is required to develop a health promotion plan with specific

objectives for all areas of health promotion. Information on the health consequences of smoking is to be incorporated into training on alcohol and drug abuse prevention specified in DoD Instruction 1010.5. Health care providers are encouraged to advise tobacco users of the risks associated with use, the benefits of quitting, and where to obtain help to quit. Along with these educational efforts, the health promotion directive provides for a series of actions to protect nonsmokers from second-hand smoke and, in general, "to create a social environment that supports abstinence and discourages the use of tobacco products" (DoD Directive 1010.10, p. 4).

Military personnel can take advantage of educational offerings at the time of enlistment, at permanent change of station (PCS) moves, during professional or military education, and after a drug- or alcohol-related incident. For enlisted personnel, such programs are designed to raise awareness about prevention and the legal consequences of substance abuse; for officers and commanders, the goal is to offer information regarding the responsibilities of the military's leadership toward prevention of alcohol abuse and any illicit drug use.

9.2 Alcohol, Other Drug, and Tobacco Use Programs Across the Services

DoD instructions set forth general policy guidelines, whereas Service instructions make these policies operational within the military. In some cases, Service instructions expand upon or add policies. The quality and effectiveness of the alcohol, other drug, and other health programs can be attributed to the quality, precision, and scope of these instructions and to the men and women who carry them out. The individual Services reflect the overriding DoD philosophy of the basic incompatibility between alcohol and other drug abuse and military service. This philosophy is evident in the Services' emphasis on deterrence, detection, and discipline as basic elements of programs they develop. The ultimate aim of the DoD is zero tolerance of alcohol and drug abuse and the Services have made progress toward this goal. Generally, across all the Services, the sanctions applied for officers' violation of alcohol and drug abuse policies are more severe than those for enlisted personnel. The types of prevention programs currently in place across all Services vary more than the deterrence and detection mechanisms such as the urinalysis test.

In addition to offering drug and alcohol abuse prevention and treatment, each of the Services has smoking prevention and cessation programs. The antitobacco focus is included with the health promotion programs of the Services.

9.2.1 Army

Army policy states that alcohol abuse and other drug abuse are incompatible with military service and have a negative impact on readiness, morale, and productivity. The Army Alcohol and Drug Abuse Prevention and Control Program

(ADAPCP) seeks to deter, identify, and rehabilitate drug and alcohol abusers through a centrally managed, locally implemented command program.

The ADAPCP consists of prevention, education, identification, and rehabilitation programs at 190 outpatient counseling centers and 7 residential treatment centers worldwide. Prevention and education services are provided to Army personnel upon entry into the Service, at training schools, upon change of assignment, and at other training events. Prevention and education services are also provided to civilian employees and family members. The Army emphasizes early identification of abusers using biochemical testing, law enforcement initiatives, and commander involvement. For those soldiers who demonstrate potential for further service, rehabilitation services are provided through medically supervised programs.

Deterrence of alcohol and other drug abuse is a major Army initiative. The most effective deterrents to drug use are urinalysis testing and strong command policies. The Army tests approximately 1.2 million urine specimens annually and has successfully reduced the urinalysis positive rate from 10% in 1983 to less than 1% in 1991. Officers and noncommissioned officers (sergeant and above) who are identified as drug abusers are processed for separation; enlisted personnel who have 3 or more years of military service (active or reserve component) are also processed for separation. Enlisted personnel with fewer than 3 years of service who have been identified in 2 separate instances of drug abuse likewise are processed for separation. Soldiers who are involved in serious instances of alcohol-related misconduct are considered for separation.

The Army views alcohol as the primary abuse problem. Although alcohol use is legally and socially accepted, on-duty impairment is not tolerated. A blood alcohol level of 0.05% or higher while on duty is a punishable offense for all Army personnel. The Army has initiated a broad-spectrum program of deglamorization of alcohol that has resulted in a reduction of driving while impaired (DWI) offenses and a reduction in per capita alcohol consumption.

The ADAPCP rehabilitation services are offered through a short-term education/awareness program, outpatient individual or group counseling, and hospital-based residential treatment (6-8 weeks) with 1-year aftercare counseling. Soldiers who fail to adequately participate in or successfully complete rehabilitation are processed for separation.

The aim of tobacco cessation within the Army Health Promotion Program is to promote personnel readiness, good health, and improved work performance. Army policy recognizes that cigarette smoking is the chief avoidable cause of premature death in the United States. The Army Fit to Win antitobacco use program consists of six program

areas that installation commanders are encouraged to implement and adapt to local circumstances. The program areas include:

- conducting a needs assessment to determine the scope of the tobacco use problem;
- providing information to heighten awareness about the value of a tobacco-free environment;
- providing education to deglamorize tobacco usage, and create a positive image of stopping tobacco use;
- offering cessation intervention to help personnel stop smoking;
- evaluating group smoking cessation programs; and
- following policy for controlling smoking in space occupied by the Department of the Army.

Many smokers have great difficulty giving up tobacco because of the addictive properties of nicotine, which is present in all forms of tobacco. However, the Army emphasizes that, like other addictions, tobacco abuse can be effectively treated.

9.2.2 Navy

The Navy has adopted a zero-tolerance philosophy toward alcohol and drug abuse and is striving to establish an abuse-free environment. The Navy pursues its goals of prevention and control through programs emphasizing education, detection, deterrence, treatment, and rehabilitation. New officers and enlisted personnel receive drug and alcohol training, instruction which is extended to service schools and command training, as well as a variety of alcohol and drug awareness training and public information programs throughout their careers. In addition, the Navy has a 36-hour prevention program, the Navy Alcohol and Drug Safety Action Program (NADSAP), that is offered fleet-wide. NADSAP grew out of the Alcohol Safety Action Program (ASAP) model that was used to intervene with convicted drinking drivers. While NADSAP is still used for that purpose, it has grown into a broader prevention program stressing personal responsibility and addressing other negative behaviors besides alcohol and other drug abuse. Included are stress reduction, suicide prevention, HIV-AIDS prevention, and smoking cessation. NADSAP is targeted primarily at the 18- to 26-year-old age group. Approximately 40,000 Navy members attend NADSAP each year, about 20% of those for an alcohol-related incident.

The Navy depends heavily on urinalysis testing for drug abuse deterrence and detection. In 1991, approximately 1.75 million urine tests were done, testing for marijuana, cocaine, PCP, amphetamines, barbiturates, LSD, and opiates. Less than 1%

(0.64%) were positive for the presence of one or more drugs, down from 2.98% in 1985. Beginning in 1992, illicit drug use by any Naval personnel is not tolerated and anyone testing positive is processed for separation.

The Navy organizes its alcohol abuse prevention and rehabilitation programs according to the intensity of intervention delivered. Level I intervention includes a local command education program and NADSAP attendance. Level II includes screening and outpatient counseling provided through approximately 75 counseling and assistance centers located worldwide. In 1991, almost 18,000 Navy members were screened at these programs, over 90% for alcohol abuse and the remainder for drug abuse. More than 3,000 Naval personnel were counseled for alcohol abuse. Level III provides rehabilitation interventions at 24 inpatient facilities. During 1991, nearly 4,000 Naval personnel were treated at these facilities for alcohol abuse.

Another component of the Navy's alcohol abuse prevention efforts is the Alcohol and Drug Abuse Managers/Supervisors (ADAMS) program. This program offers 4-hour training programs to managers to develop and evaluate effective command programs, and 8-hour supervisors' training sessions on prevention, identification of drug or alcohol problems in those under their supervision, and treatment referral procedures. Additional prevention efforts targeted at alcohol abuse include activities such as mandatory alcohol server training requirements for club personnel, and designated-driver programs. Instruction BUPERSINST 1710.13 clearly states that "Moderation by those who choose to drink alcoholic beverages is the expected standard of conduct" (Section 408, pp. 4-6; emphasis added).

A key element of the Navy's health promotion instruction, OPNAVINST 6100.2, is tobacco use prevention and cessation. It is the Navy's policy to create an environment that supports abstinence and discourages tobacco use, to create a healthy working environment, and to provide workers with encouragement and professional assistance to stop smoking. Commands are required to issue a written tobacco policy that lists designated smoking areas and restricts smoking to these areas. These areas must be outdoors or have a separate exhaust directly to the outdoors to avoid contamination of common air. A key element of the instruction is the creed that when conflicts arise between the rights of smokers and nonsmokers, those of nonsmokers shall prevail.

9.2.3 Marine Corps

The Marine Corps has a policy of nontolerance of alcohol and other drug abuse. While incorporating rehabilitation into their goal of identifying, treating, and returning alcohol abusers to active duty, the Marine Corps treats alcohol abuse differently than drug abuse. All Marines confirmed as drug abusers are processed for separation regardless of pay grade the first time they are identified as having used illicit drugs.

Drug abusers requiring treatment are treated at a Veterans' Administration Medical Treatment Facility in conjunction with their discharge. The urinalysis program is a major tool for the detection and deterrence of drug abuse. The random urinalysis program is such that the number of random specimens collected each year is about three times the number of active duty members of the Marine Corps. The use of field testing expands the program beyond the 550,000 samples tested annually at the Navy Drug Screening Laboratories.

Extensive drug and alcohol awareness programs are offered to all Marines throughout their career. Every Marine must attend a drug and alcohol training session at least once per year. A highly specialized substance abuse awareness seminar is offered, in 18 sessions annually, to the senior leadership.

The Marine Corps drug and alcohol program is organized into three levels: identification and preventive education; evaluation, referral, and outpatient treatment; and inpatient/residential treatment at a Navy Alcohol Rehabilitation facility.

The Marine Corps Health Promotion Program, SEMPER FIT 2000, establishes health objectives for the year 2000 that include cessation programs directed at the use of tobacco products. Smoking in Marine Corps facilities is prohibited except in "smoking designated areas." Commands are encouraged to provide tobacco cessation programs.

9.2.4 Air Force

Air Force drug and alcohol programs emphasize education, drug testing, and alcohol rehabilitation. Alcohol and other drug abuse training is conducted during basic military/accession point training, during base newcomer's/senior officer's orientations, and as part of professional military education. The Air Force relies on urine testing for drugs as a major component of its deterrence and detection efforts. The Air Force conducts random drug tests of 4 to 5% of personnel annually.

The Air Force's alcohol and other drug treatment and rehabilitation program is organized into residential and nonresidential components. At a minimum, individuals identified for drug and alcohol abuse are evaluated and receive education. At the commander's discretion, individuals identified for alcohol abuse are evaluated and placed in nonresidential treatment. The duration of nonresidential treatment is approximately 6 weeks. If more extensive treatment is indicated, commanders may place individuals into an Air Force residential treatment center for a 28-day program. Participants in the residential component receive a 1-year follow-on support program. Generally, Air Force commanders administratively discharge all identified drug abusers. Retention on active duty is at the discretion of the commander.

The Air Force regulation governing smoking (AFR 30-27) states:

- Nonsmoking is the Air Force norm.
- Smoking is prohibited in all facilities except in designated smoking areas not used by nonsmokers.
- Smoking is prohibited in common areas.
- Smoking is prohibited in eating facilities, bars, and lounges unless ventilation and air circulation is adequate to protect nonsmokers.
- Students may not smoke during normal duty hours.
- Smokers and nonsmokers will not be billeted together, when possible. If billeted with nonsmokers, smokers will not smoke in billets.
- Advertisements for tobacco products are not permitted in Air Force publications.[1]
- Education and cessation programs will be offered through base health promotion programs. Health care providers will advise smokers of risks and refer smokers to installation smoking cessation programs.

9.2.5 Summary of Alcohol, Other Drug, and Tobacco Program Emphases

Alcohol and other drug abuse programs offered by the individual Services are tailored to the specific needs of their personnel. While all the Services embrace the overall DoD drug and alcohol abuse policies, program offerings and sanctions for detection of abuse of drugs vary across the Services. Significant progress toward the DoD goal of zero tolerance for abuse of drugs has been made. The reduction of the abuse of alcohol has been receiving a great deal of attention. Rehabilitation is a major component of the alcohol abuse reduction efforts. Smoking cessation policies have become a central focus of health promotion programs in all Services. The differences among the Services in drug and alcohol abuse policies reflect factors unique to the individual Services, such as the philosophy about the causes of abuse, the types of persons being accessioned to the Service, age of members, and supervisory factors.

9.3 Context of Alcohol, Other Drug, and Tobacco Program Emphases

Most 1992 approaches to the prevention of substance use incorporate multiple strategies. In this section we first describe various perspectives on prevention. Following

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[1]Item was not in effect at the time the 1992 Worldwide Survey was conducted.

this discussion, we consider service members' beliefs about the effects of alcohol and drug use.

9.3.1 Perspectives on Prevention

The public health model of substance use specifies three avenues of access to prevention--the individual (host), substance (agent), and environment (Moore & Gerstein, 1981; West, 1984). Strategies targeting the host attempt to prevent abuse by changing the individual's knowledge, behavior, and attitudes about substance use (Durell & Bukoski, 1984). Examples include education programs that emphasize the negative effects of alcohol and drug use on health and the potential legal consequences. The Services make such programs available to military personnel at entry, at permanent change of station (PCS) moves, during military education, and after an alcohol or drug-related incident. They educate both enlisted personnel and officers about the health and legal ramifications of substance use. In addition, officers and commanders receive training that includes leaders' responsibilities for preventing abuse.

Additional strategies targeting the host aim to prevent substance abuse by creating a climate supportive of nonuse of illicit drugs or controlled use of alcoholic beverages. Health promotion efforts strive to foster healthy lifestyles incompatible with substance abuse. The military's establishment of health promotion programs should encourage the kind of health practices that result in further declines in substance abuse.

Prevention strategies aimed toward the agent are designed to control use by regulating the availability and cost of use. Examples of agent-oriented practices include raising prices of alcohol and cigarettes, restricting the hours of sale of alcohol, enforcing minimum age requirements for purchases, and restricting the areas where drinking or smoking is allowed. Agent-directed prevention strategies addressing illicit drugs enforce the ban on the sale of such substances.

Environmentally directed prevention strategies attempt to minimize the risk and injury associated with substance abuse by modifying the environment in which the potential abuser exists. Examples include improving roads and road signs to minimize the risks of accidents by impaired drivers. These strategies are less the responsibility of the military than of governmental, consumer, and citizen safety organizations.

9.3.2 Perceived Acceptability and Risks of Alcohol and Other Drug Use and Smoking

Attitudes of military personnel towards alcohol and other drug abuse and tobacco use and the perceived effects on health and well-being create an atmosphere of acceptance or nonacceptance of the use of alcohol, illicit drugs, and tobacco. The military can mount educational and informational campaigns to shape beliefs and perceptions

about use, abuse, and their consequences. Alcohol and other drug use and incidents of abuse along with tobacco use should decrease once personnel are aware of the risks and consequences associated with use or if use is made less acceptable.

Table 9.1 presents information regarding the percentages of individuals who agreed or disagreed with several items tapping beliefs and perceptions. While 22.9% of military personnel believed that everyone is encouraged to drink at social functions at their installation and 27.3% believed that drinking is a part of being in the military, only 7.4% believed that it is easy to use drugs at their installation's social functions. Thus, it appears that only a quarter of all military personnel believed that alcohol use is part of the accepted norms in the military but 9 out of 10 saw other drug use as unacceptable in social settings.

The majority of military personnel were aware of the health consequences of using alcohol, other drugs, or tobacco. From 80.5 to 86.6% believed that alcohol or other drug use can pose health risks and 94.3% saw smoking as harmful to their health. While only 3.7% reported that alcohol use sometimes interferes with their work, over a third (36.7%) saw heavy drinking as reducing the readiness of their unit. This perception may have been tied to the knowledge of alcohol use levels in the military. The majority of personnel were not heavy drinkers but they did perceive the deleterious effect on their unit's performance by those who do abuse alcohol. With other drug use, 84.6% agreed with the hypothetical statement that drug use would interfere with their work.

While there were few differences among the Services in beliefs about the acceptability, effects, and risks of alcohol and other drug use, those in the Marine Corps saw alcohol use as more acceptable than did the other Services, with 33.8% responding that drinking is part of the military and 26.6% stating that drinking is encouraged at social functions. Air Force personnel were less likely than personnel in other Services to believe that alcohol use affects the readiness of their units. This perception may have been due to the lower level of heavy alcohol use among Air Force personnel.

Trends from 1985 to 1992 on perceived acceptability of alcohol and drug use are presented in Table 9.2. When we considered all military personnel, we saw a slight decline in those who saw drinking as part of being in the military. The largest changes over time occurred with perceptions relating to encouragement to drink, which has steadily dropped from 34.9% agreeing in 1985 to 22.9% in 1992. We also found a downward trend with ease of other drug use at social functions, which has declined from 15% in 1985 to 7.4% in 1992. Thus, social acceptance of drug and alcohol use is on the decline although the percentage who perceive drinking as part of the military has remained relatively steady over the past 7 years (26% to 30%). Each of Services displayed the same lessening of acceptability between 1985 and 1992 as the entire DoD. The one exception was with the Marine Corps, which showed an increase of those indicating that

Table 9.1 Perceptions Relevant to Education Programs on Alcohol, Other Drug, or Tobacco Use

Perception/Item	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Acceptability of Use					
Drinking is part of being in the military	27.0 (1.4)	25.4 (0.8)	33.8 (4.2)	27.4 (1.2)	27.3 (0.7)
Everyone is encouraged to drink at social functions at this installation	23.3 (1.4)	18.7 (1.3)	26.6 (2.5)	25.7 (1.4)	22.9 (0.7)
It's easy to use drugs at parties or social functions at this installation	9.5 (1.2)	8.2 (1.3)	10.9 (1.8)	2.9 (0.4)	7.4 (0.6)
Smoking is part of being in the military	16.3 (0.8)	15.0 (1.7)	11.3 (1.3)	11.5 (0.9)	14.0 (0.7)
Effects on Work and Readiness					
Drinking sometimes interferes with my work	3.3 (0.3)	5.2 (1.3)	5.7 (1.1)	1.7 (0.3)	3.7 (0.4)
Heavy drinking reduces the readiness of my unit	41.0 (1.6)	40.5 (1.8)	38.7 (1.4)	27.3 (1.5)	36.7 (1.0)
Using drugs would interfere with my work	81.4 (1.2)	83.9 (1.8)	83.8 (0.9)	88.9 (0.5)	84.6 (0.7)
Effects on Health					
Drinking will interfere with my health or physical fitness	78.9 (1.0)	82.8 (1.2)	81.1 (1.8)	79.5 (1.0)	80.5 (0.6)
Using drugs would interfere with my health or physical fitness	83.4 (1.1)	84.9 (2.0)	88.2 (1.3)	91.2 (0.4)	86.6 (0.8)
Using drugs would mess up my mind	80.7 (1.2)	83.2 (1.5)	85.1 (1.0)	88.7 (0.5)	84.2 (0.6)
Smoking will harm my health or physical fitness	92.9 (0.5)	94.4 (0.9)	94.2 (0.7)	96.0 (0.3)	94.3 (0.3)
Being around people who are smoking will harm my health	80.4 (0.9)	81.9 (0.8)	82.8 (1.1)	85.9 (0.7)	82.7 (0.5)

Note: Data are percentages who "agreed" or "strongly agreed" with the item. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 9.2 Trends in Perceived Acceptability of Using Alcohol or Other Drugs, 1985-1992

Service/Item	Year of Survey 1985	1988	1992
Army			
Drinking is part of being in the military	29.7 (1.5)	25.9 (1.0)	27.0 (1.4)
Everyone is encouraged to drink at social functions at this installation	34.4 (1.1)	27.5 (1.3)	23.3 (1.4)
It's easy to use drugs at parties or social functions at this installation	21.0 (1.9)	13.0 (1.2)	9.5 (1.2)
Navy			
Drinking is part of being in the military	30.0 (1.6)	26.2 (1.4)	25.4 (0.8)
Everyone is encouraged to drink at social functions at this installation	33.6 (1.2)	28.4 (1.2)	18.7 (1.3)
It's easy to use drugs at parties or social functions at this installation	15.0 (1.3)	11.5 (2.3)	8.2 (1.3)
Marine Corps			
Drinking is part of being in the military	32.8 (2.7)	26.3 (1.8)	33.8 (4.2)
Everyone is encouraged to drink at social functions at this installation	32.7 (3.4)	31.2 (1.6)	26.6 (2.5)
It's easy to use drugs at parties or social functions at this installation	13.6 (3.4)	12.7 (1.1)	10.9 (1.8)
Air Force			
Drinking is part of being in the military	29.5 (1.4)	26.7 (0.9)	27.4 (1.2)
Everyone is encouraged to drink at social functions at this installation	37.3 (1.4)	32.7 (1.3)	25.7 (1.4)
It's easy to use drugs at parties or social functions at this installation	8.4 (1.0)	4.6 (0.4)	2.9 (0.4)
Total DoD			
Drinking is part of being in the military	30.0 (0.8)	26.2 (0.6)	27.3 (0.7)
Everyone is encouraged to drink at social functions at this installation	34.9 (0.7)	29.6 (0.7)	22.9 (0.7)
It's easy to use drugs at parties or social functions at this installation	15.0 (0.9)	10.0 (0.8)	7.4 (0.6)

Note: Data are percentages who "agreed" or "strongly agreed" with the item. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

drinking is part of being in the military from 26.3% in 1988 to 33.8% in 1992, which is at roughly the same level as in 1985 (32.8%).

Trend data on perceptions of health effects of alcohol and drug abuse are presented in Table 9.3. Beliefs about the risks associated with alcohol use have remained relatively constant since 1985, with approximately 80% of military personnel seeing potential harm with abusing alcohol. Personnel increasingly have seen other drug use as harmful to one's health, particularly to mental functioning. The pattern of beliefs about increased risk associated with drug use was similar across each of the Services.

The perceptions of military personnel in 1992 about alcohol and other drug use acceptability and risks indicated that a general climate encouraging controlled alcohol use and nonuse of other drugs exists in the military. These perceptions suggest that prevention programs operated by the military are having a desired effect. Nonetheless, the fact that a quarter of personnel still viewed alcohol use as part of being in the military and believed everyone is encouraged to drink at social occasions is of concern. Continuing educational efforts, enacting policies targeted at availability, offering a wide range of nonalcoholic beverages at social functions, and encouraging alternative forms of entertainment other than drinking are all strategies that planners can use to target these views.

9.3.3 Perceptions of Regulatory Policies

Military policy regulates the availability of alcohol and other drugs on installation premises by establishing hours and prices for alcohol sales, controlling the availability of drugs, enforcing DWI laws, and establishing the sanctions associated with drug- and alcohol-related incidents. As shown in Table 9.4, over half of all personnel believed that social functions make drinking easy at their installations and 61.1% believed the availability of cigarettes makes smoking easy. At the same time, 52.9% believed that alcoholic beverages are too expensive, suggesting that pricing policies were probably placing some limits on consumption. Thus, perceptions were mixed about policies regulating alcohol and cigarette accessibility, with half seeing alcohol and tobacco use fostered by policies and practices but half also still seeing alcohol prices as too high. The military may benefit from continued monitoring and refining of policies relating to alcohol and tobacco availability and use as a means to further discourage smoking and abuse of alcohol.

Nine out of 10 believed that driving while impaired (DWI) on the military installation would lead to arrest. The DWI regulation, then, is likely to serve as a deterrent to drinking and driving because the majority of military personnel saw being arrested as a likely outcome. Perceived tolerance of drug use is on the decline. In this survey, we found that approximately two-thirds believed that marijuana users should be

Table 9.3 Trends in Perceived Health Effects of Alcohol and Other Drug Use, 1985-1992

Service/Item	Year of Survey 1985	1988	1992
Army			
Drinking will interfere with my health or physical fitness	80.2 (1.0)	79.2 (0.8)	78.9 (1.0)
Using drugs would interfere with my health or physical fitness	80.9 (1.4)	81.9 (0.7)	83.4 (1.1)
Using drugs would mess up my mind	69.5 (1.4)	72.5 (1.2)	80.7 (1.2)
Navy			
Drinking will interfere with my health or physical fitness	83.2 (1.4)	80.2 (0.8)	82.8 (1.2)
Using drugs would interfere with my health or physical fitness	85.8 (0.8)	85.0 (1.3)	84.9 (2.0)
Using drugs would mess up my mind	72.5 (1.6)	75.9 (2.4)	83.2 (1.5)
Marine Corps			
Drinking will interfere with my health or physical fitness	80.8 (1.8)	78.9 (2.6)	81.1 (1.8)
Using drugs would interfere with my health or physical fitness	80.5 (1.3)	86.3 (1.0)	88.2 (1.3)
Using drugs would mess up my mind	69.8 (1.4)	79.4 (1.9)	85.1 (1.0)
Air Force			
Drinking will interfere with my health or physical fitness	80.3 (1.0)	77.8 (0.8)	79.5 (1.0)
Using drugs would interfere with my health or physical fitness	86.2 (0.8)	85.1 (0.9)	91.2 (0.4)
Using drugs would mess up my mind	78.2 (1.4)	78.8 (0.8)	88.7 (0.5)
Total DoD			
Drinking will interfere with my health or physical fitness	81.0 (0.6)	79.0 (0.5)	80.5 (0.6)
Using drugs would interfere with my health or physical fitness	83 7 (0.6)	84.1 (0.5)	86.6 (0.8)
Using drugs would mess up my mind	72.9 (0.8)	76.0 (0.8)	84.2 (0.6)

Note: Data are percentages who "agreed" or "strongly agreed" with the item. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 9.4 Beliefs About Regulatory Policies

Belief/Item	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Availability					
Social functions at this installation where alcohol is available make drinking easy	47.6 (2.1)	50.5 (1.8)	53.5 (4.0)	61.8 (1.8)	53.1 (1.0)
Alcoholic beverages cost too much	52.3 (1.9)	57.0 (1.0)	51.6 (3.5)	49.6 (2.5)	52.9 (1.1)
Number of places to buy cigarettes at this installation makes smoking easy	65.1 (2.0)	59.0 (3.7)	67.4 (2.7)	56.5 (1.7)	61.1 (1.4)
Sanctions					
Driving on-base while intoxicated is a sure way to get arrested	90.0 (1.0)	89.3 (1.5)	92.6 (1.1)	91.6 (0.7)	90.5 (0.6)
Anyone detected using marijuana should be discharged	60.5 (1.1)	68.1 (3.1)	66.3 (1.0)	70.6 (0.9)	66.3 (1.0)
Disciplinary action will be taken against any person violating my Service's tobacco use policy	21.4 (1.0)	31.5 (2.6)	17.6 (1.0)	25.8 (1.0)	25.3 (0.9)

Note: Data are percentages who "agreed" or "strongly agreed" with the item. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

discharged, which is a sizable increase from 1985 when 45.5% agreed with this position. During this same period, marijuana use in the military dropped nearly 50% (see Section 5.4 in Chapter 5).

Belief in the effectiveness of tobacco policies was much weaker, with only 25.3% agreeing with the statement that disciplinary actions would be taken against those who violate them. There was significant variability across the Services on this item, with 17.6% of Marines agreeing with it but 31.5% of Navy personnel believing action would be taken.

These findings support the conclusion that military regulatory policies generally are effective and that most military personnel believe these policies have an impact on use of alcohol and drugs. Although strides have been made, additional gains are possible particularly with alcohol and tobacco, as half of military personnel believe that certain aspects of the military environment facilitate their use.

9.3.4 Participation in Alcohol or Other Drug Education Programs

One component of efforts to curtail drug use and alcohol abuse by military personnel has been educational programs. Table 9.5 summarizes findings on participation in these programs and personnel's assessment of the benefits of the program. Just over half of all officers (59.2%) and enlisted personnel (55.1%) believed they had attended an alcohol or other drug education class. Enlisted personnel were more likely to report that they benefited from the experience, 44.1% of those attending as opposed to 37.2% of officers. Navy personnel were most likely to indicate that the experience was beneficial, with 53.5% of officers and 56.1% of enlisted personnel agreeing with the statement. The lowest amount of benefit was with the Air Force, the Service with the lowest rate of drug use and alcohol abuse. The fact that those in the Air Force reported the least benefit may reflect either the quality of the program, or more likely, the relevance of the information. Given the low level of alcohol and other drug use in this Service, many Air Force personnel may not see the need for participation in educational programs.

9.4 Context of Alcohol and Other Drug Use Treatment Programs

For alcohol and drug problems to be effective, the personnel whom they are designed to reach not only must be aware of their existence, but also must be willing to use the programs. Factors that inhibit program participation ultimately impede the Services' rehabilitation efforts.

9.4.1 Barriers to Seeking Help

There are many reasons that individuals may not actively seek help for drug or alcohol problems. Examples include a belief that getting help is difficult, could

Table 9.5 Participation in Alcohol/Drug Education, by Pay Grade

Pay Grade/Item	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Enlisted					
Attended alcohol/drug education	54.3 (1.7)	59.7 (4.0)	56.7 (2.3)	50.1 (1.6)	55.1 (1.3)
Benefited from alcohol/drug education*					
Agree or strongly agree	38.3 (1.6)	56.1 (1.3)	42.3 (3.9)	35.0 (1.6)	44.1 (1.2)
Disagree or strongly disagree	27.2 (1.5)	24.5 (1.4)	28.6 (2.8)	30.5 (1.1)	27.2 (0 8)
Don't know/no opinion	34.5 (1.9)	19.4 (1.3)	29.0 (2.9)	34.5 (1.4)	28.7 (1.1)
Officer					
Attended alcohol/drug education	60.4 (3.8)	62.6 (3.8)	78.5 (2.9)	51.9 (4.7)	59.2 (2.2)
Benefited from alcohol/drug education*					
Agree or strongly agree	31.1 (2.1)	53.5 (3.3)	48.9 (5.7)	28.4 (3.7)	37.2 (2.1)
Disagree or strongly disagree	33.3 (2.0)	25.9 (3.6)	23.6 (2.2)	38.3 (2.6)	32.3 (1.5)
Don't know/no opinion	35.5 (2.3)	20.7 (1.6)	27.5 (5.9)	33.3 (2.9)	30.6 (1.4)

Note: Table entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

*Percentages are of those who attended alcohol/drug education.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

have a detrimental effect on one's military career, or could result in disciplinary action. Although having a drug or alcohol abuse problem could result in discharge, the Services have established policies that encourage efforts to obtain assistance. Discharge is the consequence for untreated problems or failed rehabilitative efforts.

As Table 9.6 indicates, military personnel saw as a major barrier to seeking treatment for an alcohol problem the belief that disciplinary action would be taken against the person (59.3%). Ranking second in importance was the belief that the commander would find out (43.4%) and, third, that seeking help would damage one's career (36.0%). Less important reasons were fear of surprise searches (14.4%) and difficulty in getting off duty to attend sessions (14.0%).

Some differences in these perceptions are evident across the Services. Air Force personnel were more likely than those in the other Services to believe that seeking help for alcohol and drug problems might damage their careers, whereas Marines were more likely than those in the other Services to express concern about their commander finding out. Concerns about disciplinary actions and surprise searches were similar across all the Services. Air Force personnel were less likely than other Service personnel to believe that they would have difficulty getting off duty to attend counseling. However, obtaining time off was not a major barrier for any of the Services.

The majority of these perceptions have remained remarkably constant since 1985. The one exception is an increased concern that seeking treatment would damage one's career. This concern has steadily increased since 1985 for the entire DoD as well as for each of the individual branches.

The propensity of military personnel to seek treatment for an abuse problem must be examined in view of the disciplinary actions and other policies regulating alcohol and other drug abuse treatment. While policies encourage rehabilitation, especially for junior enlisted first offenders, personnel may feel that seeking help will result in negative consequences, especially in view of discharge practices for drug offenders. For this reason, some personnel may not feel free to seek help, regardless of stated policies.

9.4.2 Participation in Counseling and Treatment Programs

As Table 9.7 indicates, few military personnel reported actually receiving treatment for an alcohol or other drug problem. Only 9.5% of all active-duty personnel reported having received treatment for an alcohol problem, and 1.4% reported receiving treatment for a problem with some other drug. The Marine Corps had the smallest percentage of all Services reporting treatment or counseling for drug problems, which is inconsistent with the finding that drug use was the highest in this branch. Although fewer Air Force personnel reported having been treated for an abuse problem, their lower treatment rates are likely closely tied to lower use levels. Both drug and alcohol

Table 9.6 Trends in Perceived Barriers to Seeking Help for Alcohol Abuse

Service/Item	Year of Survey 1985		1988		1992	
Army						
If seek treatment, will later experience surprise searches	18.2	(1.3)	15.8	(1.0)	16.2	(1.1)
Can't get help for drinking problem without one's commander finding out	47.0	(1.6)	46.1	(1.3)	47.0	(2.0)
Have trouble getting off-duty to attend counseling sessions	17.1	(1.1)	15.2	(1.0)	15.9	(1.4)
Disciplinary action will be taken against a person (with a drinking problem)	57.1	(1.5)	56.0	(1.2)	56.3	(1.1)
Seeking help for a drinking problem will damage one's military career	26.1	(1.5)	27.6	(0.9)	34.8	(1.0)
Navy						
If seek treatment, will later experience surprise searches	14.8	(1.2)	14.1	(2.0)	13.3	(1.3)
Can't get help for drinking problem without one's commander finding out	40.8	(1.5)	40.0	(1.5)	39.5	(1.9)
Have trouble getting off-duty to attend counseling sessions	16.6	(1.3)	15.8	(2.9)	16.8	(2.0)
Disciplinary action will be taken against a person (with a drinking problem)	55.6	(1.4)	56.2	(1.5)	59.9	(1.1)
Seeking help for a drinking problem will damage one's military career	19.6	(1.4)	27.0	(1.0)	31.4	(1.1)
Marine Corps						
If seek treatment, will later experience surprise searches	15.1	(1.2)	18.0	(1.7)	16.7	(1.7)
Can't get help for drinking problem without one's commander finding out	48.5	(3.6)	47.3	(3.1)	51.3	(1.5)
Have trouble getting off-duty to attend counseling sessions	12.9	(2.3)	15.6	(2.5	16.9	(2.3)
Disciplinary action will be taken against a person (with a drinking problem)	57.4	(1.9)	56.4	(1.9)	61.3	(1.6)
Seeking help for a drinking problem will damage one's military career	25.4	(2.0)	31.9	(2.3)	34.4	(2.8)
Air Force						
If seek treatment, will later experience surprise searches	10.7	(1.0)	13.0	(0.9)	12.6	(0.7)
Can't get help for drinking problem without one's commander finding out	40.5	(2.1)	40.2	(1.1)	40.7	(1.2)
Have trouble getting off-duty to attend counseling sessions	5.8	(0.5)	7.6	(0.5)	7.7	(0.6)
Disciplinary action will be taken against a person (with a drinking problem)	62.0	(1.8)	62.5	(1.2)	61.1	(1.8)
Seeking help for a drinking problem will damage one's military career	31.0	(1.4)	36.3	(1.0)	42.9	(1.2)
Total DoD						
If seek treatment, will later experience surprise searches	14.8	(0.7)	14.7	(0.7)	14.4	(0.6)
Can't get help for drinking problem without one's commander finding out	43.6	(1.0)	42.7	(0.8)	43.4	(1.0)
Have trouble getting off-duty to attend counseling sessions	13.2	(0.7)	13.1	(1.0)	14.0	(0.9)
Disciplinary action will be taken against a person (with a drinking problem)	58.2	(0.9)	58.0	(0.7)	59.3	(0.7)
Seeking help for a drinking problem will damage one's military career	25.8	(0.8)	30.4	(0.6)	36.0	(0.7)

Note: Data are percentages of those who "agreed" or "strongly agreed" with the item. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 9.7 Participation in Alcohol and Other Drug Counseling and Treatment Programs

Counseling and Treatment Program	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Alcohol Program					
Through military medical facility	3.4 (0.4)	4.6 (0.5)	4.9 (0.7)	3.6 (0.3)	4.0 (0.2)
Through military treatment program	7.8 (0.6)	10.0 (0.7)	9.4 (0.7)	5.9 (0.5)	8.1 (0.4)
Through civilian medical facility	0.7 (0.3)	0.4 (0.2)	1.1 (0.3)	0.3 (0.1)	0.6 (0.1)
Through civilian treatment program	1.8 (0.5)	1.2 (0.3)	2.2 (0.5)	1.0 (0.2)	1.4 (0.2)
Any counseling or treatment	9.4 (0.8)	11.1 (0.6)	10.9 (0.9)	7.3 (0.5)	9.5 (0.4)
Drug Program					
Through military medical facility	0.6 (0.2)	0.8 (0.2)	0.1 (0.1)	0.2 (0.1)	0.5 (0.1)
Through military treatment program	1.4 (0.2)	1.5 (0.3)	0.4 (0.3)	0.7 (0.1)	1.1 (0.1)
Through civilian medical facility	0.1 (0.1)	** (**)	** (**)	** (**)	0.1 (**)
Through civilian treatment program	0.2 (0.1)	0.1 (0.1)	** (**)	0.1 (**)	0.1 (**)
Any counseling or treatment	1.8 (0.2)	1.8 (0.3)	0.5 (0.3)	1.0 (0.2)	1.4 (0.1)

Note: Entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

treatment were more likely to be provided through a military treatment program than through military medical facilities or through civilian medical facilities or treatment programs.

9.5 Beliefs About Urinalysis Programs

The urinalysis program, which began in 1981, has been credited in large measure with the decline in drug use in the military. Table 9.8 presents the perceptions of military personnel regarding the effects of the urinalysis program.

An estimated 13% of military personnel believed that they would be more likely to use drugs in the absence of urinalysis testing, down from 22.7% in 1988 who believed that urinalysis testing had kept them from using drugs. This decrease in individual deterrence does not necessarily reflect a lessened effectiveness of testing. A more likely explanation is that, in general, there was less of an inclination to use drugs in 1992 than was the case in 1988. Four out five responded they would not use drugs even if there were no urinalysis testing. Military personnel were more willing to attribute a deterrent effect to others, with 43.5% indicating that other people in their unit would be more likely to use drugs in the absence of testing. When we compared responses from drug users and nonusers, we found that the users were nearly five times more likely to report that testing reduced their likelihood of using drugs (51.9% compared to 10.5%). This suggests that testing is reaching its intended audience, the potential user. Over half of the users (55.9%) believed that users will curtail their use when they think they will be selected for testing. This points to the need for developing selection procedures for testing, such that personnel do not believe they will be able to predict when they might be selected.

Marine Corps personnel were more likely than those of the other Services to believe that the urinalysis testing deters drug use. A greater proportion of Marines answered that testing influences their personal decision about using drugs, their perceptions of the influence of testing on drug use by others in their units, and the impact on use among those who use drugs.

Half of military personnel believed the urinalysis tests are reliable, a figure that is up from the 41.2% in 1988. Drug users were much less likely to trust the results of testing and to believe that users can avoid detection, with 60.5% of users thinking detection can be avoided compared to 36.9% of nonusers. Air Force personnel were less likely than other personnel to believe that there are ways to circumvent detection by the tests. Less than 10% of DoD personnel believed that drug testing programs hurt morale.

In general, military personnel believed that urinalysis testing has significant deterrent effects. We observed the largest differences in beliefs about urinalysis testing when we compared drug users and nonusers. Users were more likely than nonusers to

Table 9.8 Beliefs About Urinalysis Program

Effect/Item	Service				Total DoD	Total DoD	
	Army	Navy	Marine Corps	Air Force	Total DoD	User	Nonuser
Deterrent Effects							
I would be more likely to use drugs in absence of testing	13.8 (1.4)	15.3 (1.5)	19.2 (1.6)	7.5 (0.6)	13.0 (0.7)	51.9 (3.0)	10.5 (0.5)
People in my unit would be more likely to use drugs	50.9 (2.1)	47.8 (3.6)	57.0 (4.3)	25.9 (1.5)	43.5 (1.6)	74.1 (2.9)	41.5 (1.4)
I wouldn't use drugs even if there were no urinalysis testing	76.3 (1.5)	77.0 (2.3)	75.6 (0.9)	86.3 (0.8)	79.3 (0.9)	35.1 (2.6)	82.2 (0.8)
Some drug users curtail use when they think they will be selected for urinalysis	29.0 (2.1)	22.4 (2.0)	30.8 (3.6)	7.3 (0.4)	21.0 (1.1)	55.9 (2.4)	18.7 (1.0)
Reliability							
Tests are reliable	50.4 (1.4)	54.7 (2.5)	52.6 (1.1)	46.2 (1.3)	50.7 (0.8)	41.9 (2.7)	51.3 (0.9)
People get away with using certain drugs that can't be detected	45.4 (1.9)	40.2 (1.1)	49.8 (1.5)	24.7 (0.7)	38.4 (0.8)	60.5 (2.8)	36.9 (0.8)
Effects on Morale							
Emphasis on detection and discipline in my Service's drug program hurts morale	11.8 (1.0)	11.0 (2.0)	10.1 (1.3)	6.1 (0.6)	9.7 (0.7)	27.7 (3.2)	8.6 (0.6)

Note: Entries are percentages who "agreed" or "strongly agreed" with the item. Standard errors appear in parentheses. "User" refers to reports of any drug use during the past 12 months. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

state that urinalysis testing deterred them from using drugs and that it curtailed their drug use when they thought they would be detected. Users also were more likely than nonusers to believe that the urinalysis program hurts morale. These findings indicate that the tests are deterring drug use but suggest that drug users have learned to either (a) periodically suppress their drug use in order to avoid detection or (b) use other means to subvert the testing process. This result raises the question about the extent of forewarning of testing. Self-reported drug users tended to be more skeptical, however, and were more inclined than nonusers to see the limitations of urinalysis testing.

9.6 Summary

We examined the perceptions of military personnel about the nature and scope of the alcohol and other drug abuse problem in the Services, and the likely impact of DoD policies, programs, and practices designed to regulate and reduce alcohol abuse and other drug and tobacco abuse among military personnel.

Overall, these findings underscore the need for continued drug education, awareness, and abuse prevention programs. Both overall and in the individual Services, illicit drug use has declined dramatically over the 12 years since the survey began. The decline is likely due to a combination of factors, including societal declines in drug use as well as the effectiveness of military policies and programs addressing drug abuse.

9.6.1 Perceived Acceptability and Risks of Alcohol and Other Drug Use and Smoking

The attitudes that military personnel hold toward the use of alcohol, other drugs, and tobacco, and the perceived effects on health and well-being, help shape a social climate that may either reinforce or discourage alcohol, other drug, and tobacco use and abuse (see Table 9.1).

- A majority of military personnel (over 80%) believed that alcohol or other drug use was a threat to health and fitness and 94.3% saw smoking as harmful.
- Although only 3.7% reported that drinking sometimes interferes with their work and 84.6% believed that using drugs would interfere with their ability to do their job, over a third saw heavy drinking as reducing the readiness of their unit.
- Most personnel did not believe that drinking and drug use were broadly accepted social norms in the military, indicating that the Services offer a climate supportive of reasoned use of alcohol and nonuse of other drugs. The need for further prevention efforts is suggested by the finding that 27.3% of personnel believed that drinking is part of the military and 22.9% perceived that everyone is encouraged to drink at social functions.

9.6.2 Perceptions of Regulatory Policies

The military controls access to alcohol, drugs, and tobacco on its installations by setting the hours and prices for alcohol and tobacco sales and by enforcing the sanctions for illegal alcohol and other drug use and possession. The extent to which military personnel view these control policies and practices as effective indicates the degree to which they are having a positive impact on the use of alcohol, other drugs, and tobacco (see Table 9.4).

- Perceptions were mixed about the impact of alcohol and tobacco availability on use of these substances. Over half of military personnel (53.1%) believed that social functions make drinking easy, 61.1% agreed that the availability of cigarettes makes smoking easy, and half (52.9%) indicated that alcoholic beverages are too expensive.

- Over 90% of all personnel believed that driving while impaired on the military installation would lead to arrest, which offers strong support for the effectiveness of DWI enforcement. We observed less confidence with smoking policies, with only a quarter (25.3%) believing sanctions would be applied. Approximately two-thirds (66.3%) believed that marijuana users should be discharged, a significant increase from 45.5% in 1988, indicating a lessening of tolerance for those who use illicit drugs.

9.6.3 Participation in Alcohol or Other Drug Education Programs

Alcohol and other drug education has been one component of the military's effort to minimize problems associated with substance abuse (see Table 9.5).

- Just over half of military personnel perceived that they had participated in an alcohol or other drug education program (55.1% of enlisted personnel; 59.2% of officers). Among those participating in the program, a higher percentage of enlisted personnel (44.1%) than officers (37.2%) reported that they benefited from the experience.

- Navy personnel were most likely to indicate a benefit from educational programs (56.1% of enlisted personnel; 53.5% of officers), whereas Air Force personnel reported the least benefit (35.0% of enlisted personnel; 28.4% of officers). Fewer reports of benefits of educational programs by the Air Force may, in part, reflect their low rates of alcohol and other drug use. Those who do not have a problem are not likely to see a benefit from learning about the problem.

9.6.4 Context of Alcohol and Other Drug Use Treatment Programs

Precursors to the effectiveness of alcohol and other drug treatment programs are awareness of the programs and the perceived absence of barriers to participation (see Tables 9.6 and 9.7).

- Most military personnel had not received alcohol or other drug abuse treatment. Only 9.5% reported treatment for an alcohol problem and 1.4% for some other drug problem.

- Most of those treated received counseling and treatment through a military treatment program rather than through a medical facility or through civilian programs and facilities.

- The major barriers to seeking help for an alcohol problem were perceptions that: (a) disciplinary action would result (59.3%), (b) commanders would find out (43.4%), and (c) one's military career would be damaged (36.0%). Concern about seeking treatment damaging one's career has increased steadily since 1985 (25.8% in 1985 and 30.4% in 1988).

9.6.5 Beliefs About Urinalysis Programs

The urinalysis program has been associated with a decline in illicit drug use in the military (see Table 9.8).

- Although 13.0% of military personnel reported that they might be more likely to use drugs in the absence of urinalysis testing, 79.3% maintained that they would not use drugs even if there were no urinalysis testing.

- Testing appears to be influencing its intended audience. Drug users were 5 times more likely than nonusers to report that urinalysis reduces the likelihood of their using drugs (51.9% of users vs. 10.5% of nonusers).

- Trust in the reliability of testing has increased, with 50.7% in 1992 seeing tests as reliable, compared to 41.2% in 1988.

Military policies and programs appear to be effective in creating an environment conducive to nonabuse of alcohol and nonuse of illicit drugs and tobacco. Personnel were generally aware of the health risks of alcohol and other drug use and abuse and were moderately aware of the potential effects on job performance and combat readiness. The substantial declines in drug use since the urinalysis testing program began in 1981 and beliefs of military personnel in its deterrent properties lend support to the conclusion that the program is an effective strategy for preventing and reducing drug use.

Survey findings suggest two areas where the military may profit from targeted strategies. First, half of personnel responded that certain aspects of the military environment make alcohol and tobacco use easy. This result indicates that additional efforts could further target the availability of these two substances. Second, the fact that a sizable number of personnel perceived barriers to seeking help for alcohol abuse, suggests the need for a closer examination of existing policies governing the sanctions for voluntary help-seeking. Reducing these sanctions would likely strengthen the military's rehabilitative efforts.

10. HEALTH BEHAVIOR AND HEALTH PROMOTION

In developing the 1992 Worldwide Survey items, we recognized the role that a broad range of health behaviors and risk factors other than substance use can have on work performance, military readiness, and the overall well-being of military personnel. Beginning in 1985, the Worldwide Survey series has reflected the broader health promotion perspective adopted by DoD and the Services. The 1992 Worldwide Survey questionnaire has retained items from previous Worldwide Surveys pertaining to numbers of illnesses and specific health practices, such as exercise and mechanisms for coping with stress. We have also included additional 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 different health conditions or health-related behaviors, and behavior changes undertaken to improve health. In this chapter, we present findings related to each of these issues. Where relevant, we discuss findings as they relate to selected Healthy People 2000 objectives. Finally in this chapter, we include a discussion of the overlap between cigarette smoking, heavy drinking, and symptoms of alcohol dependence among military personnel.

10.1 Prior Studies

10.1.1 Health Practices

Poor health practices shorten lives and adversely affect both physical and mental health. Belloc and Breslow (1972) and Breslow and Enstrom (1980) conducted a series of studies over a 10-year period that demonstrated that good health practices have an additive effect on health. Those who engaged in more of the seven practices that they examined were healthier than those who engaged in fewer. These practices were: "having never smoked," "drinking less than 5 drinks at one sitting," "sleeping 7-8 hours per night," "exercising," "maintaining desirable weight for height," "avoiding snacks," and "eating breakfast regularly." Indeed, a number of studies have documented that these behaviors are not independent. For instance, Norton and Colliver (1988) found that 14% of the U.S. population used alcohol and other drugs within the past month, and Istvan and Matarazzo (1984) found moderate to strong relationships between alcohol and tobacco use. The 1985 and 1988 Worldwide Surveys also documented moderate correlations between use of alcohol, other drugs, and cigarettes and a somewhat weaker relationship between substance use and other health practices (Bray et al., 1986; Bray et al., 1988). Because of the additive effect of substance use and other health practices on health status, and the performance and safety problems posed by joint use of alcohol and other drugs, the interrelationship of these substances suggests that many military personnel are affected.

Since the 1979 Surgeon General's Report on Health Promotion and Disease Prevention, these and other health behaviors known to affect morbidity and mortality have been monitored in the U.S. population through two principal surveys--the National Health Interview Survey (National Center for Health Statistics) and the Behavioral Risk Factor Survey (Centers for Disease Control [CDC]). Concern about health practices among military personnel is more recent; trends began to be monitored through the Worldwide Survey series in 1985 and 1988, and through surveys conducted by the individual Services.

Civilian Population. In 1985, a subsample of households participating in the National Health Interview Survey completed a supplement on Health Promotion and Disease Prevention. Questions were asked about involvement in five health behaviors in addition to smoking and drinking. Each of these behaviors (eating breakfast, snacking between meals, sedentary lifestyle or low physical activity, getting 7 or 8 hours of sleep a night, and obesity) has been linked to health status. The 1985 results (generalized to the U.S. population) showed that over one-half of U.S. adults ate breakfast regularly, 29% did not snack between meals, 40% exercised regularly, about two-thirds got adequate sleep each night, and about 24% of the population were more than 20% over their desired weight. Sex differences on most of these behaviors were small, although women were somewhat less likely to exercise regularly (38%) and were somewhat more likely to be above their desired weight (22%). Older persons were more likely to eat breakfast and less likely to eat between meals, less likely to exercise regularly, and more likely to sleep less (NCHS, 1985, 1988).

Trends in health practices in the United States have also been monitored at the state level since 1981 through CDC's Behavioral Risk Factor Survey. From 1981 to 1983, 25 state health departments conducted telephone surveys in cooperation with the CDC. In 1984, the CDC established the Behavioral Risk Factor Surveillance System (BRFSS), and 15 states conducted monthly risk factor surveys throughout the year. By 1990, 44 states and the District of Columbia were participating in the BRFSS (Siegel et al., 1991).

Cardiovascular disease risk factors (e.g., obesity, smoking, cholesterol levels, sedentary lifestyle), alcohol use, and driving-related behavior (e.g., seat belt use) have been the primary foci of these surveys. Because the prevalence estimates reported as part of the BRFSS are state-specific (as opposed to being national-level estimates), the prevalence of specific risk factors or high-risk behaviors has varied from state to state. However, some trends have been apparent with regard to the median prevalence rates.

In particular, the median prevalence of cigarette smoking among the participating states has shown steady declines across each of the years from 1986 to 1990 for adults 18 and older (26.5% in 1986 vs. 22.7% in 1990; Siegel et al., 1991). It appears, however, that there has been relatively little progress with respect to reductions in other cardiovascular

disease risk factors, notably sedentary lifestyles (defined as involvement in fewer than three 20-minute sessions of leisure time physical activity per week) and obesity (as measured by the ratio of self-reported body weight to height). The median prevalence of adults 18 and older with a sedentary lifestyle remained relatively constant from 1986 to 1990, at 58 to 59%. In addition, the median percentage of adults who were overweight was higher in 1990 (22.7%) than in any of the years from 1987 to 1989 (approximately 20%; Siegel et al., 1991).

Beginning in 1987, questions about participation in preventive health activities, such as cholesterol screening, were added to the survey (Siegel et al., 1991). In 1987, the percentage of adults who indicated that they had ever had their cholesterol checked ranged from 29 to 57%, with a median of 47% (32 states and the District of Columbia participating in 1987; Morbidity and Mortality Weekly Report, 1988a). By 1989, the median prevalence had risen to 55.1% (38 states and the District of Columbia participating), and ranged from 48.0% to 63.7% (Morbidity and Mortality Weekly Report, 1991). These findings are consistent with trends observed in studies cosponsored by the National Heart, Lung, and Blood Institute and the Food and Drug Administration, in which the percentage of respondents (approximately 4,000 individuals surveyed each year) who had ever had their blood cholesterol checked increased from 35% in 1983 to 46% in 1986 (Schucker et al., 1987). There was also a significant increase from 1983 to 1986 in the percentage of respondents who believed that lowering one's blood cholesterol would have a large effect on preventing heart disease or a heart attack (64% vs. 72%; Schucker et al., 1987).

Military Population. Health practices of military personnel have been monitored through surveys conducted by the individual Services and by the Worldwide Surveys beginning in 1985. These surveys in general followed the procedures of Belloc and Breslow and focused on the seven health practices included in the civilian surveys. The 1985 survey found that most military personnel engaged in positive health practices: 93% reported that they met proper weight standards; 67% exercised regularly; 70% ate properly; 54% had good sleeping habits; about 86% had used no drugs during the past year; 62% drank moderately or less; and about 41% had never smoked. Of these seven health practices, military personnel were, on average, involved in 4.7 practices, and about two-thirds reported being involved in at least five. Involvement in health practices was related to the number of illnesses, doctor visits, and hospitalizations (Bray et al., 1986).

Several studies of health practices have been conducted by the individual Services, and have found even better results. As with alcohol and other drug use, however, the prevalence of health behaviors among personnel within a Service depended at least in part on the sociodemographic composition of the Service; if a Service had older personnel on average, for instance, its health behaviors and health status may have differed from Services with a younger population. In a 1986 study comparing health practices of Air

Force personnel and civilians, Vogel found that rates of smoking were lower and overall involvement in health practices was higher than for all DoD personnel in the 1985 Worldwide Survey, but that rates of drinking were similar. A study of health practices among captains at Wright Patterson Air Force Base found reductions in smoking, reductions in alcohol consumption, increases in exercise, no change in the frequency of eating breakfast or snacks, increases in weight, and poorer sleeping habits for personnel since they began active duty (Hyde, 1986). In one of several studies of health behaviors among Navy personnel, Cronan and Conway (1988) found that smoking levels among recruits were considerably lower than among shipboard personnel, and that smokers were more likely to be older, white, and better educated. Using data from the 1985 Worldwide Survey, Ballweg and Bray (1989) found that a significantly larger percentage of nonsmokers reported "excellent" health than did smokers.

10.1.2 Health Promotion

Health promotion programs are an integrated, holistic approach to encouraging health by emphasizing optimal functioning in physical, social, and psychological areas of life. Such programs are targeted at a whole group of people--such as all employees of a company, or all residents of a town--with special emphasis on those engaging in behaviors such as smoking, alcohol and other drug use, or poor nutrition and poor eating habits that threaten good health. Program activities generally focus on three goals: risk assessment, risk avoidance, and risk reduction. Individuals at risk for adverse health outcomes are identified and encouraged to engage in behaviors that improve current health status and enhance future status (Best & Cameron, 1986; Goodstadt, Simpson, & Loranger, 1987; Perry & Jessor, 1985).

Civilian Population. Health promotion efforts in the civilian sector have focused on physical fitness, smoking cessation, prevention of alcohol and other drug abuse, weight reduction, and screening for hypertension and risk factors for cardiovascular disease (Vogel, 1986). The workplace is the most common setting for these programs since, in the civilian sector, businesses generally have more resources than local governments or health departments to implement the programs, and they have a financial incentive to do so.

Many companies have implemented health promotion programs or expanded employee assistance programs in the past 10 years to provide more health-related services and to encourage healthier employees. Some researchers have reported results such as significant decreases in absenteeism, sick leave, and turnover and increases in job satisfaction and perceived productivity (South Carolina Health Services, 1983; Vogel, 1986; Massachusetts Health Services, 1985; Castillo-Salgado, 1984). Programs that have concentrated on physical fitness and exercise have reported reductions in weight and percentage of body fat, improved fitness, increased lung capacity, and lower cholesterol

(South Carolina Health Services, 1983; M ıssachusetts Health Services, 1985; Hyde, 1986; Vogel, 1986).

Other studies have attempted to assess the "bottom line" financial impact of workplace health promotion programs. For example, a survey conducted by Health Research Institute of the 1,500 largest companies in the U.S. found that average annual health care costs for workers in companies where health promotion programs were provided were $806 compared with $1,015 in companies overall. Kennicott Cooper reported savings of $5.78 for each $1.00 spent on health promot ›n activities (South Carolina Health Services, 1983). Kristein (1977) reported that . edical costs saved each year were $200 for each employee who stopped smoking, $260 for each employee who gained control of blood pressure, and $60 for each employee who reduced his or her cholesterol level by 20%.

Military Population. Within the military, concern about the impact of unhealthy behaviors on health status, job performance, and readiness of military personnel was reflected in the report of the DoD Blue Ribbon Panel on Health Promotion (1985) and the 1986 Directive No. 1010, Health promotion, that followed (described in Chapter 1). As noted in Chapter 1, the directive pledged to implement health promotion programs in the military that emphasized the following areas known to be related to increased longevity and improved health:

- smoking prevention,
- physical fitness,
- nutrition,
- stress management,
- alcohol and other drug abuse prevention, and
- hypertension prevention.

A full assessment of the impact of health promotion programs in the military is beyond the scope of this report, but the 1985, 1988, and 1992 Worldwide Surveys provide basic information for monitoring involvement in health practices. In this chapter we assess progress in the health areas other than substance use, including possible areas for additional effort.

As noted above, health promotion programs have been widely implemented in civilian settings with substantial tangible results. Productivity has increased through fewer worker absences, and employers have saved the cost of employee benefits such as paid leave and medical care services. Only recently, with the introduction of the health

promotion directive in 1986, has the military begun a highly focused effort on health promotion. The 1985 Worldwide Survey provided baseline data about health practices and behaviors, and the 1988 survey provided information with which to assess trends in those practices and behaviors.

10.2 Healthy People 2000 Objectives

In addition to the Healthy People 2000 objectives on tobacco use that we discussed in Chapter 6, the 1992 Worldwide Survey included items that provide information on progress by military personnel toward the following health promotion or disease prevention objectives:

- increasing to at least 20% the proportion of people aged 18 or older who engage in vigorous physical activity that promotes the development of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion;
- increasing to at least 90% 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;
- increasing to at least 75% the proportion of adults who have had their blood cholesterol checked in the past 5 years;
- increasing to at least 90% the proportion of people with high blood pressure who are taking action to help control their blood pressure; and
- increasing to more than 50% the proportion of sexually active, unmarried people who used a condom at last sexual intercourse (PHS, 1991).

We present data pertaining to the first three of these objectives in Section 10.4.2. In Section 10.6.3 , we present data on actions taken to control high blood pressure, and in Section 10.4.6, we discuss findings pertaining to condom use.

10.3 Health Problems

One indicator of general health status is the number of illnesses experienced within the year. To get a general measure of illness, we asked survey respondents to report the number of times they were sick in the past 12 months with symptoms such as feeling flushed or sweaty, or having runny nose or eyes, chills, nausea or vomiting, stomach cramps, diarrhea, muscle pains, or severe headaches. Findings from the 1985 and 1988 Worldwide Surveys indicated that military personnel on average reported approximately 2.45 and 3.40 occurrences of these illnesses during the year, respectively. In 1992, military personnel had an average of 3.05 occurrences of these illnesses during the year. Similar findings were evident for each of the individual Services. The average

numbers of illnesses for the total DoD and each of the Services for 1985, 1988, and 1992 are shown in Figure 10.1.

Bray et al. (1988) noted that one possible interpretation of the increase in the number of these general illnesses from 1985 to 1988 might have been that military personnel were becoming more conscious of health issues. However, the decrease in the number of reported illnesses from 1988 to 1992 suggests that the rate of these illnesses may be fluctuating from year to year around some central value.

10.4 Health Behaviors

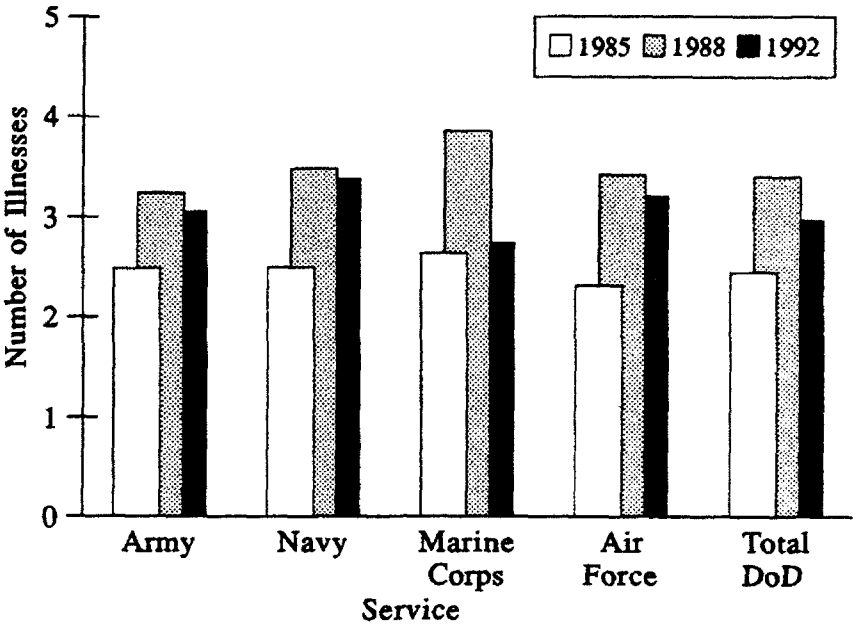
10.4.1 Health Practices Indexes

As noted above, good health has been found to be associated with engaging in sound health practices, including moderate use of alcohol, nonuse of tobacco, regular exercise, eating breakfast, not eating between meals, getting a good night's sleep, and meeting weight standards (Belloc & Breslow, 1972; Breslow & Enstrom, 1980). The greater the number of these health practices a population engages in, other things being equal, the lower the mortality rates.

The health practices examined in the 1992 Worldwide Survey were roughly comparable to those examined by Belloc and Breslow, but we did not include a question about eating between meals and we did include an item about drug use. Because of the near universality of military personnel in meeting weight standards, we omitted this item from the 1988 and 1992 questionnaires. Thus, we considered six health practices altogether. As in the 1985 and 1988 surveys, we dichotomized each of these health practices as healthy or unhealthy. Table 3.1 in Chapter 3 presents average scores across the six health practices. In 1985, total DoD personnel engaged in an average of 3.79 out of the six health practices. In 1988, there was a small but significant increase relative to 1985, to an average of 3.91 health practices, but then in 1992, the average number of these health practices decreased back to 3.81, or to roughly the same level as in 1985 (Table 3.1).

The percentage of personnel in the total DoD and the individual Services who reported having engaged in each of the six specific health practices is presented in Table 10.1. Across the total DoD, 58.7% met the criterion of moderate alcohol use or less; 93.8% used no other drugs within the past year; 38.5% had never smoked; 70.9% exercised regularly; 65.9% ate meals regularly; and 58.1% got at least six consecutive hours of sleep at least five nights per week. As stated above, the resulting number of health practices averaged 3.81 out of the set of all six practices, or 1.93 practices out of the set of three practices excluding alcohol, other drug, and tobacco use. These findings were similar for each of the individual Services.

Figure 10.1 Trends in Average Number of Illnesses, 1985-1992



Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

10.4.2 Participation in Screening or Education Activities

The 1992 Worldwide Survey included questions on activities that are designed to screen for specific health risks. These activities included: screening for high blood pressure, screening for high blood cholesterol, personal fitness assessments (in addition to annual required personal fitness tests), and administration of a Health Risk Appraisal (HRA). The latter typically involves an assessment of "lifestyle factors," such as substance use, exercise, eating habits, sexual behavior, and motor vehicle operation (e.g., seat belt use, speeding) that place an individual at increased risk for infectious disease, chronic disease, and injury. More detailed HRAs also include assessment of family history of disease (e.g., cancer, cardiovascular disease), and environmental factors, such as potential occupational hazards (Green & Lewis, 1986).

We also asked respondents about their participation in various health education activities designed to prevent or reduce health risks. These health education activities included: smoking cessation classes, nutrition education or counseling, back injury prevention classes, cancer prevention or awareness classes, stress management classes, and education or counseling pertaining to sexually transmitted diseases (STDs).

Table 10.1 Individual Health Practices and Scores on Health Practice Indexes

Individual Practice	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Moderate alcohol use or less	56.6	(1.7)	59.3	(1.7)	49.5	(1.2)	63.8	(1.0)	58.7	(0.9)
No other drug use in the past 12 months	92.3	(0.8)	93.4	(1.9)	89.3	(1.3)	97.7	(0.3)	93.8	(0.6)
Never smoked	38.6	(1.3)	36.9	(1.2)	35.1	(1.1)	41.3	(1.1)	38.5	(0.6)
Exercise twice a week or more	86.0	(1.2)	58.5	(3.7)	84.3	(1.2)	62.6	(1.9)	70.9	(1.8)
Eat two full meals a day at least 5 days a week	64.5	(1.3)	65.7	(1.9)	67.1	(1.2)	67.1	(0.8)	65.9	(0.8)
Sleep more than 6 consecutive hours a day at least 5 days a week	53.5	(1.5)	54.4	(4.6)	56.7	(1.9)	67.5	(0.9)	58.1	(1.7)
Health Practice Index A (All items above)	3.86	(0.05)	3.64	(0.09)	3.77	(0.02)	3.95	(0.04)	3.81	(0.04)
Health Practice Index B (Items 4-6 above)	2.02	(0.03)	1.77	(0.10)	2.06	(0.03)	1.95	(0.03)	1.93	(0.04)

Note: Entries for the first six items are percentages of individuals practicing the behavior (with standard errors in parentheses). Entries for the Health Practice Indexes A and B are mean scores. For these indexes, each respondent was credited one point for each healthy behavior.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Findings pertaining to participation in each of these activities are presented in Table 10.2. Although respondents had the opportunity to indicate if they did not know whether they had participated in a particular activity, few indicated that they did not know; the vast majority indicated that they either had or had not participated (data not shown). Nevertheless, readers should be cautioned that an apparent high percentage of personnel not having received or participated in a particular activity will include at least some personnel who did receive or participate in the activity but were not aware that they had.

In addition, findings indicating that higher percentages of personnel had not received or participated in a particular activity may have been due in part to personnel not needing to be screened, or not needing intervention. As indicated by Woodruff and Conway (1991), for example, Navy regulations do not require personnel under the age of 25 to be screened for high blood cholesterol, 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.

Approximately two-thirds of personnel in the total DoD and in all four Services had their blood pressure checked in the past year. Although the time frame for the Healthy People 2000 objective is the past 2 years rather than the past year, this finding that over two-thirds (67.2%) of all military personnel had their blood pressure checked within the past year alone suggests that the military will not have much difficulty in meeting this blood pressure screening objective of 90% being screened in the past 2 years.

Slightly more than a third of all military personnel (36.0%) had their cholesterol checked within the past year, although there was considerable variability across the Services. Among the Services, 42.5% of Army personnel, 42.8% of Air Force personnel, 28.4% of Navy personnel, and 20.5% of Marine Corps personnel had their cholesterol levels checked. These findings on cholesterol screening in the past year are difficult to interpret in light of the Healthy People 2000 objective, which is to increase to 75% the proportion of adults who have had their cholesterol checked in the past 5 years. Furthermore, since individual Service regulations dictate different intervals for checkups depending on age, the percentages reported here must be interpreted accordingly. The lower rate of cholesterol screening among Marine Corps personnel may be partly attributable to a higher proportion of Marines being in the younger age groups who do not require screening, and the higher rates among Air Force personnel may reflect in part the higher proportion of Air Force personnel in the older age groups who should be screened more frequently (Table 2.4).

Compared to blood pressure screening or cholesterol checks, lower percentages of personnel in the total DoD received personal fitness assessments in addition to required personal fitness tests (26.6%), with similar rates occurring across each of the Services.

Table 10.2 Participation in Screening or Education Activities, by Service

Activity	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Blood pressure check	67.3 (1.3)	63.9 (1.3)	65.5 (1.5)	71.0 (1.0)	67.2 (0.7)
Cholesterol check	42.5 (2.2)	28.4 (2.7)	20.5 (2.8)	42.8 (1.8)	36.0 (1.4)
Personal fitness assessment[a]	29.5 (1.5)	25.7 (3.4)	23.3 (2.2)	25.5 (2.5)	26.6 (1.3)
Health Risk Appraisal	21.8 (2.3)	8.3 (1.4)	2.4 (0.7)	10.4 (1.1)	12.4 (1.0)
Stop-smoking class	4.3 (0.4)	3.7 (0.7)	2.2 (0.5)	2.3 (0.3)	3.3 (0.3)
Nutrition education or counseling	14.7 (1.3)	10.0 (2.5)	5.5 (0.7)	9.1 (0.6)	10.7 (0.9)
Back injury prevention class	7.0 (1.3)	15.1 (2.5)	4.1 (1.3)	6.2 (0.9)	8.9 (0.8)
Cancer prevention/ awareness class	4.3 (0.5)	4.0 (0.4)	1.9 (0.1)	1.3 (0.3)	3.1 (0.2)
Stress management class	17.5 (1.4)	13.2 (1.8)	9.8 (0.6)	6.1 (0.5)	12.2 (0.7)
Sexually transmitted disease education or counseling	21.8 (2.0)	18.5 (1.6)	22.1 (3.1)	4.2 (0.7)	15.8 (0.9)

Note: Table values are percentages answering yes (with standard errors in parentheses). For each of the items listed above, over 16,200 respondents provided a usable response, ranging from 16,242 who answered the item on participation in stop-smoking classes, to 16,287 who answered the blood pressure item.

[a]Does not include annual required Personal Fitness Test.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

However, slightly less than one in eight personnel in the total DoD (12.4%) received a Health Risk Appraisal (HRA), and there was considerable variation across the different Services, from a high of 21.8% of Army personnel to a low of 2.4% of personnel in the Marine Corps. However, according to information received from DoD (G. Pollack, DoD, personal communication, November 1992), it appears that only the Army at present is administering HRAs to its personnel. One hypothesis for why personnel in the other Services may have indicated that they received an HRA might be that they received some assessment of health risks or feedback about health risks in the past year that was not a formal HRA.

Lower percentages of personnel in the total DoD participated in the past year in the various health education activities that are listed in Table 10.2, ranging from 3.1% of personnel who participated in cancer prevention and awareness activities, to 15.8% of personnel who received education or counseling about STDs. However, over 15% of Navy personnel were aware that they had received education about back injury prevention, compared with 4.1% to 7.0% of personnel in the other three Services.

The lower proportions of personnel participating in smoking cessation classes relative to the proportion of personnel in the total DoD and in each of the Services who attempted to quit smoking in the past year (Table 6.11) suggest that most smokers in the military who try to quit do not use structured activities to do so. However, this finding is consistent with that of Fiore et al. (1990), who indicate, based on analysis of data from the 1986 Adult Use of Tobacco Survey, that most smokers in the United States prefer to make quit attempts on their own, without outside assistance.

10.4.3 Exercise

Data on the percentages of military personnel who reported that they engaged in strenuous exercise at least 3 days per week for at least 20 minutes per occasion are presented in Table 10.3. As indicated by the last row, over half of personnel in the total DoD and all four Services engaged in regular strenuous physical exercise for 20 minutes or more at least 3 times a week. In comparison, the Healthy People 2000 objective for the general population, as stated previously, is to increase to at least 20% the proportion of people 18 or older who engage in vigorous physical activity 3 or more days per week for 20 minutes or more per occasion. Thus, these findings indicate that this objective is already being greatly exceeded among military personnel. Given the emphasis on physical fitness as part of an overall goal of military readiness, this finding is not surprising.

10.4.4 Nutrition

Data on the types of foods regularly consumed by military personnel are shown in Table 10.4. For the total DoD, nearly 90% (87.6%) regularly consumed at least

Table 10.3 Involvement in Strenuous Exercise, Past 12 Months

Activity	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Run, cycle, or walk 20 minutes or more	78.1 (1.6)	43.6 (3.1)	68.3 (2.3)	46.4 (2.3)	57.7 (1.8)
Other strenuous exercise 20 minutes or more (e.g., swimming laps)	47.8 (1.6)	29.7 (4.8)	49.1 (1.6)	30.5 (1.2)	37.5 (1.9)
One or both types of strenuous exercise 20 minutes or more	81.5 (1.6)	50.8 (3.9)	76.7 (1.4)	53.4 (2.0)	63.8 (1.9)

Note: Entries are percentages (with standard errors in parentheses). Data are percentages engaging in the activity 3-4 days/week or more often.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

some type of food in one of the following groups: low-fat dairy products, high-fiber grains, fruits, and green or yellow vegetables. Approximately half of all personnel regularly consumed low-fat dairy products and high-fiber grains, with similar proportions observed for each of the Services. Higher proportions of personnel regularly ate fruits and green or yellow vegetables.

However, over 70% of all military personnel also regularly consumed at least one kind of high-fat or high-cholesterol food. For the specific types of high-fat or high-cholesterol foods listed in Table 10.4, sizable proportions of individuals in the total DoD and in all four Services ate high-fat meats, high-fat dairy products, and fried foods several times a week or daily. The Air Force generally had lower proportions of individuals with regular intake of high-fat foods. The data do not clearly indicate whether continued regular consumption of high-fat foods is due largely to preference or to (real or perceived) lack of alternatives. The findings do support the need for the Services to continue to search for effective means of improving the eating habits of military personnel.

10.4.5 Stress and Coping

As in 1988, we examined the use of different behaviors by military personnel to cope with perceived work-related stress. We categorized these behaviors as being "more functional" (e.g., thinking of a plan to solve the problem, exercising, etc.) or "less functional" (e.g., using alcohol or cigarettes) in helping personnel to cope. As shown in Table 10.5 for the total DoD, a majority of personnel within each of the levels of

Table 10.4 Typical Food Consumption, Past 12 Months

Item	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Foods Low in Fat and Cholesterol					
Low-fat dairy products (e.g., yogurt)	49.5 (1.5)	49.1 (2.9)	45.0 (2.4)	54.4 (1.1)	50.3 (1.1)
High-fiber grains (e.g., oatmeal)	51.6 (1.5)	48.0 (2.6)	48.5 (2.4)	52.9 (1.3)	50.5 (1.1)
Fruit (e.g., apples)	53.7 (1.3)	55.3 (1.9)	55.1 (1.5)	54.1 (1.4)	54.4 (0.8)
Green or yellow vegetables (e.g., broccoli)	68.1 (1.3)	68.9 (1.6)	74.2 (1.2)	71.7 (1.2)	70.0 (0.7)
Any of the above	86.0 (0.9)	86.7 (0.9)	88.3 (1.2)	90.0 (0.6)	87.6 (0.5)
Foods High in Fat or Cholesterol					
High-fat meats (e.g., hot dogs, hamburgers)	42.9 (1.6)	38.3 (3.4)	49.9 (2.7)	35.8 (1.3)	40.2 (1.2)
High-fat dairy products (e.g., ice cream)	43.8 (1.5)	39.4 (1.9)	45.9 (3.4)	35.1 (1.5)	40.2 (0.9)
Eggs or egg dishes (e.g., omelettes)	35.0 (2.3)	28.7 (3.3)	40.5 (1.8)	19.0 (1.0)	29.1 (1.3)
Fried foods (e.g., fried chicken)	47.6 (2.1)	45.4 (4.3)	53.3 (3.7)	35.9 (1.3)	44.2 (1.6)
Any of the above	72.9 (1.7)	69.9 (2.5)	78.5 (2.4)	64.1 (1.2)	70.1 (1.0)

Note: Table entries are percentages eating a particular type of food several times a week or daily (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 10.5 Levels of Perceived Stress at Work and Coping Behaviors

Functionality/Coping Behavior	Perceived Level of Stress		
	Higher	Lower	None
More Functional			
Think of plan to solve problem	89.7 (0.8)	91.1 (0.6)	74.8 (2.2)
Meditate/sit quietly	58.2 (0.9)	56.8 (0.9)	43.7 (2.6)
Talk to friend/family member	76.3 (1.0)	79.5 (0.7)	65.9 (2.3)
Exercise or play sports	62.0 (1.8)	69.0 (1.0)	65.7 (2.0)
Read or work on hobby	56.1 (1.0)	57.8 (1.0)	46.2 (2.5)
Watch TV/listen to music	87.7 (0.5)	88.2 (0.5)	73.0 (3.1)
Seek professional help	5.2 (0.4)	3.2 (0.4)	6.9 (1.3)
Take prescribed medication	4.4 (0.4)	3.4 (0.4)	10.6 (2.3)
Less Functional			
Light up cigarette	32.9 (1.1)	23.2 (0.9)	12.4 (1.7)
Have a drink	28.3 (1.1)	18.5 (0.8)	17.2 (2.8)
Get something to eat	59.1 (0.9)	49.8 (0.9)	40.8 (2.9)
Smoke marijuana or use illegal drugs	2.4 (0.5)	1.5 (0.3)	4.3 (1.1)
Get headache or feel ill	36.7 (0.9)	18.0 (0.6)	12.5 (2.0)
Take a nap	50.5 (1.0)	47.8 (0.9)	41.6 (2.7)
Buy something new	30.7 (0.8)	25.3 (0.6)	21.6 (2.9)
Consider hurting or killing yourself	7.4 (0.5)	2.3 (0.4)	2.8 (0.8)
Just think about things a lot	88.0 (0.6)	81.8 (0.8)	63.9 (2.5)

Note: Entries are percentages (with standard errors in parentheses). Data are percentages reporting that they frequently or sometimes engage in this behavior when they feel pressured, stressed, depressed, or anxious at work.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

perceived stress (i.e., higher, lower, and none) used the following functional behaviors to cope with stress: thinking of a plan to solve the problem (74.8% to 91.1%), seeking social support by talking to a friend or family member (65.9% to 79.5%), exercising (62.0% to 69.0%) and engaging in leisure time activities, such as watching TV or listening to music (73.0% to 88.2%). In addition, a majority of personnel who perceived being under higher levels of work-related stress (56.1%) engaged in the leisure time activities of reading or working on hobbies.

However, among personnel who perceived higher levels of stress at work, 88.0% coped by "just thinking about things a lot," 59.1% ate something when they felt stressed, and 50.5% took naps when they felt stressed. In addition, 32.9% of personnel under higher perceived levels of work-related stress smoked cigarettes, and 28.3% drank alcohol as mechanisms for coping with stress. Relatively few personnel who perceived higher levels of work-related stress sought professional help to cope with their problems (5.2%).

10.4.6 Condom Use

Although either abstinence from sexual intercourse or sexual activity within a mutually monogamous relationship are the most effective means of preventing STDs (including AIDS), proper use of condoms can reduce the risk of contracting STDs (including AIDS) among individuals who are sexually active but not in a monogamous relationship. In the United States, failure of condoms to prevent transmission of disease is due more often to improper use than to product defects (Morbidity and Mortality Weekly Report, 1988b).

At present, there are no national-level data on the proportion of individuals who engage in specific high-risk sexual activities. Therefore, for the development of Healthy People 2000 objectives relating to prevention of STDs and human immunodeficiency virus (HIV) infection, the behavior of sexually active unmarried individuals was used as a proxy measure for individuals engaging in high-risk sexual behavior. As indicated previously, the relevant Healthy People 2000 objective is to increase to at least 50% the proportion of sexually active unmarried people who used a condom at last sexual intercourse (PHS, 1991).

Data on condom use for all military personnel are presented in Table 10.6 for both married and unmarried personnel, and in Table 10.7 and Figure 10.2 for unmarried personnel only. Over half of unmarried personnel in the total DoD and in the Army and Navy who had been sexually active used a condom the last time they had sex, and over 45% of unmarried personnel in the Marine Corps and the Air Force used a condom during their last sexual encounter (Table 10.6 and Fig. 10.2). Thus, the total DoD and each of the Services already exceeded or were very close to the Healthy People 2000 objective of condom use at the last episode of sexual intercourse by at least 50% of sexually active unmarried individuals.

Data on condom use for unmarried personnel, by selected sociodemographic characteristics, are shown in Table 10.7. As might be expected, given that condoms are designed to be used by males, unmarried male personnel were generally more likely to indicate that they used a condom the last time they had sex than unmarried female personnel were to indicate that their partners had used a condom.

Condom use also varied with age of military personnel. About 54% of unmarried personnel in the 20 and younger age group in the total DoD used a condom the last time they had sex, compared to approximately 43% of unmarried personnel who were 35 or older. This difference was most pronounced among Army personnel (55% vs 40%).

Table 10.6 Sexual Activity and Condom Use, by Marital Status

Sexual Activity/ Marital Status	N	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Last Sexual Encounter						
Married	11,591	20.7 (1.2)	17.9 (1.3)	19.8 (2.6)	19.6 (0.8)	19.5 (0.6)
Unmarried	4,059	55.2 (2.5)	50.5 (1.9)	45.0 (4.0)	47.1 (1.8)	50.2 (1.2)
Usual Sexual Activity						
Married	11,760	26.7 (0.8)	24.2 (1.7)	22.3 (1.5)	23.4 (0.7)	24.6 (0.6)
Unmarried	4,130	69.5 (2.3)	63.5 (2.4)	63.2 (4.6)	65.1 (1.6)	65.5 (1.4)

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages who report using a condom. N's are total unweighted counts of respondents who reported having had sex. Estimates have not been adjusted for sociodemographic differences among Services.

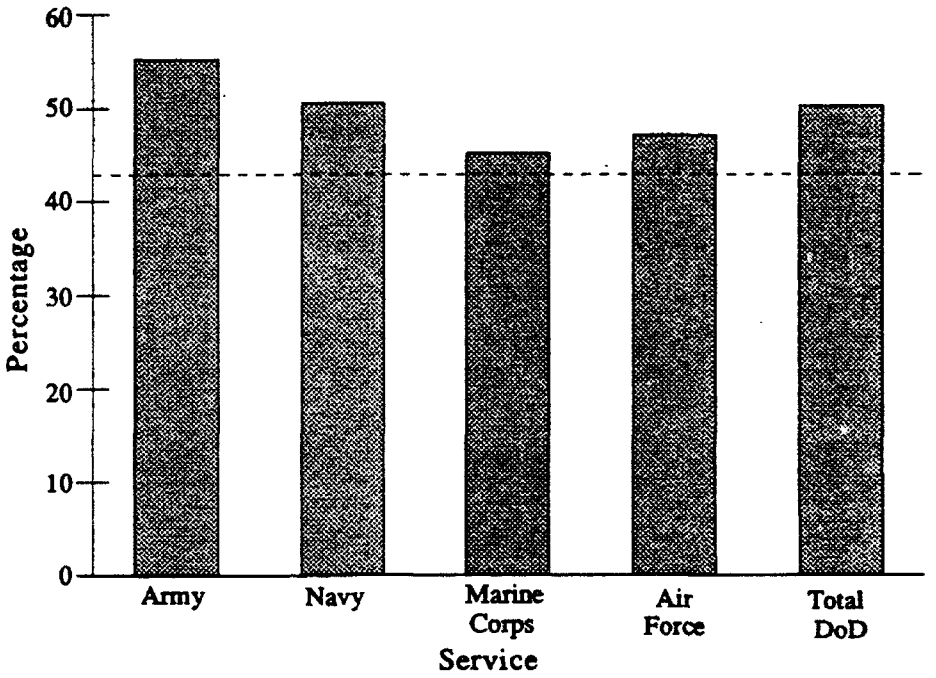
Table 10.7 Condom Use at Last Sexual Encounter for Unmarried Individuals, by Selected Sociodemographic Characteristics

Characteristic	N	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Age						
20 and under	467	59.6 (4.8)	48.3 (5.0)	55.9 (6.2)	50.7 (3.6)	53.5 (2.9)
21-25	1,215	55.8 (3.3)	49.2 (4.1)	40.8 (6.0)	48.2 (4.8)	49.4 (2.3)
26-30	827	58.4 (3.8)	60.7 (5.5)	36.0 (4.8)	49.3 (2.5)	54.6 (2.4)
31-34	545	55.8 (4.4)	42.0 (4.9)	45.4 (3.2)	43.2 (4.0)	46.1 (2.5)
35 and older	1,005	39.1 (2.9)	48.1 (4.8)	44.9 (2.8)	40.9 (3.8)	43.2 (2.3)
Sex						
Male	3,253	57.5 (3.0)	52.5 (2.5)	45.0 (4.6)	48.7 (2.1)	51.8 (1.5)
Female	806	44.1 (3.5)	44.6 (4.1)	+ (+)	41.2 (2.6)	43.7 (2.3)
Pay Grade						
Enlisted	3,500	55.6 (2.7)	51.1 (2.2)	44.9 (4.1)	47.4 (1.8)	50.6 (1.3)
Officer	559	52.0 (4.1)	42.1 (5.3)	47.6 (7.1)	45.0 (3.4)	46.8 (2.3)
Total	4,059	55.2 (2.5)	50.5 (1.9)	45.0 (4.0)	47.1 (1.8)	50.2 (1.2)

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages of unmarried personnel who have ever had sex who reported that they (or their partner) used a condom the last time they had sex. N's are total unweighted counts of unmarried respondents in each sociodemographic category who report having had sex.

+Unreliable estimate.

Figure 10.2 Condom Use at Last Sexual Encounter for Unmarried Personnel, by Service



Note: Estimates have not been adjusted for sociodemographic differences among Services.
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Personnel in the Air Force followed the pattern for DoD (51% vs 41%). Among unmarried Marine Corps personnel, however, there was less of a clear pattern; the lowest rate of condom use at individuals' last sexual encounter occurred among 26- to 30-year-olds (36.0%). In the Navy, the rates of condom use at last sexual encounter were roughly comparable across all age groups except for the 26 to 30 age group, where 60.7% of unmarried personnel used a condom during their last sexual encounter.

These generally higher rates of condom use among younger unmarried personnel are encouraging, in that they suggest that these younger personnel have been heeding the messages about the importance of using condoms if they are going to be sexually active. Conversely, the finding that unmarried personnel who were 35 or older were generally less likely to have used a condom the last time they had sex could be a cause for concern, as many of these personnel could still be engaging in behaviors that place them at increased risk for HIV infection or infection with other STDs. In addition, the differences in condom use among sexually active unmarried men and (condom use by the sexual partners of) unmarried women suggest that, all other things being equal, a higher proportion of women may be potentially placing themselves at increased risk for HIV

infection or infection with other STDs. In particular, military women may be placing themselves at increased risk for contracting and spreading STDs such as gonorrhea or chlamydia, which often do not produce symptoms in infected women until later stages of the infection.

However, there are some limitations to these data that do not permit a more detailed assessment of risk. Specifically, the 1992 Worldwide Survey did not include questions on specific high-risk sexual activity, such as multiple partners. Therefore, it is not possible to determine from these data the baseline levels of high-risk sexual activity among military personnel, nor is it possible to determine the degree of regularity with which those individuals who are at highest risk for AIDS or other STDs have been using condoms.

10.5 Health Risk Factors

Two important goals of health promotion programs are to assess individuals' current health risks and, where necessary, to reduce these risks by encouraging individuals to make appropriate changes in their behavior. Secondary prevention efforts where a disease condition is already present, such as high blood pressure or elevated blood cholesterol, focus on early detection to reduce the likelihood of future complications or disability (Mausner & Kramer, 1985). In this section, we examine the occurrence of risk factors among military personnel as well as the perceptions of personnel about the potential harm associated with these risk factors.

10.5.1 Identified Risk Factors

We asked 1992 Worldwide Survey respondents whether they had been told by a doctor or other health professional in the past year that they (i.e., the respondents):

- had high blood cholesterol,
- had high blood pressure,
- needed to lose weight,
- needed to quit smoking,
- needed to change the way they managed stress,
- were not maintaining an adequate exercise program,
- needed to change their eating habits, or
- needed to change their sexual behavior.

The percentages of personnel who were told that they had these risk factors or needed to change their behavior in any of these areas are shown in Table 10.8. Because some individuals may not have been screened for particular health problems or risk factors in the past year, or because certain issues may not have been addressed in any doctor visits that personnel may have had in the past year, readers should consider these percentages to be conservative, "lower bound" estimates of the prevalence of these problems in the military.

An estimated 9.9% of all military personnel were identified by a health professional in the past year as having high blood cholesterol, 7.9% were identified as having high blood pressure, 9.0% were identified as being overweight, and 12.0% were identified as needing to change their eating habits. Similar percentages of personnel in all four Services were identified as having high blood pressure. Higher percentages of personnel in the Army and the Air Force were identified as having high blood cholesterol (12.1% of personnel in both Services), compared to 9.9% for the total DoD, and 11.0% of Navy personnel were identified as being overweight, compared to 9.0% of all military personnel. However, the Army and the Air Force also had the two highest percentages of personnel ages 35 or older (25.0% Army, 28.2% Air Force; Table 2.4). Similarly, given the younger age profile of the Marine Corps, with 57.2% of Marine Corps personnel ages 25 or younger, it is not surprising that there were lower rates of personnel in the Marine Corps who were identified as having high blood cholesterol or being overweight. As indicated previously, however, a lower percentage of Marine Corps personnel may have been identified as having high blood cholesterol because they may not have been tested if they were under 25.

An estimated 15.5% of personnel in the total DoD were advised by a health professional in the past year to quit smoking. In comparison, 40.4% in the total DoD had smoked cigarettes in the past year and 35.0% had smoked in the past 30 days (see Tables 3.1 and 6.11). Depending on the regularity with which personnel have seen health care providers, there are several explanations for this lower rate who were advised to quit smoking relative to the overall rate of smokers. One reason is that smokers were less likely to visit a health professional in the past year and, therefore, had not been advised to quit. A second reason may be circumstances in which health care providers did not counsel smokers to quit. If a patient was seen for an unrelated reason, such as treatment of an injury, smoking may not have been a salient issue, particularly if the doctor was very busy. Some smokers may also have denied or not recalled that they had been advised to quit, especially if the advice to quit was delivered in the context of a brief medical visit.

Compared to those who received advice about blood pressure, smoking and eating habits, lower percentages of personnel were advised to change the way they managed stress, that they needed to start maintaining a more adequate exercise program, and that

Table 10.8 Identified Health Risk Factors, Past 12 Months

Risk Factor	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
High blood cholesterol all screened	12.1 (0.8)	7.4 (1.2)	4.4 (1.5)	12.1 (0.7)	9.9 (0.6)
High blood pressure all screened	9.4 (0.8)	8.1 (1.1)	6.3 (0.7)	6.8 (0.7)	7.9 (0.5)
Overweight	8.2 (0.6)	11.0 (0.5)	4.7 (0.7)	9.2 (0.5)	9.0 (0.3)
Smoker, told to quit	15.9 (0.8)	15.9 (0.6)	12.8 (0.7)	15.6 (1.0)	15.5 (0.4)
Difficulty managing stress	8.1 (0.7)	8.0 (0.8)	6.2 (0.9)	6.0 (0.3)	7.3 (0.4)
Lack of regular exercise	4.2 (0.3)	7.8 (0.5)	2.3 (0.5)	8.5 (0.8)	6.3 (0.?)
Poor eating habits	12.1 (0.8)	12.7 (0.7)	8.3 (0.7)	12.4 (0.6)	12.0 (0.4)
Risky sexual behavior	3.4 (0.6)	2.8 (0.6)	4.3 (0.6)	1.1 (0.1)	2.7 (0.3)
Total risk factors	0.73 (0.03)	0.74 (0.02)	0.49 (0.03)	0.72 (0.03)	0.70 (0.02)

Note: Table entries are percentages who were told by a health professional in the past year that they had a particular risk factor or needed to change a particular health behavior, except for total risk factors. Total risk factors are mean counts of risk factors listed above (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

they needed to change their sexual behavior. Compared to the DoD total of 2.7%, slightly higher percentages of Army and Marine Corps personnel were advised by a health professional to make changes in their sexual behavior (3.4% of Army, 4.3% of Marine Corps). The higher rate of Marine Corps personnel being advised to change their sexual behavior may reflect, in part, the younger age distribution within this Service.

Overall, data collected from personnel at the time they present for routine physical examinations, such as the health promotion tracking system being developed for use in the Navy (Woodruff & Conway, 1991) may provide more accurate measures of the prevalence of these problems in the military. In particular, use of instrumentation through which health care providers, rather than the patients themselves, record results, such as blood pressure or cholesterol numbers, could allow for more accurate measurement of these conditions, rather than expecting personnel to recall and interpret their test results.

10.5.2 Risk Perceptions

Data on military personnel's perceptions of the health risks associated with different health factors (e.g., high blood pressure) or behaviors are shown in Table 10.9. Over 80% of individuals in the total DoD and all four Services perceived a great or moderate health risk associated with having high blood cholesterol, having high blood pressure, being overweight, smoking cigarettes, and engaging in unprotected casual sex (i.e., no condom used). In addition, over 80% of personnel in all Services except the Marine Corps believed that difficulty managing stress poses great or moderate risks to a person's health. Lower percentages of personnel believed that there is a great or moderate risk to health if a person does not exercise regularly or eat a balanced diet. Depending on how personnel are defining "balanced" diet, this latter result could indicate that although personnel generally recognize the potential health risks associated with having high blood cholesterol, having high blood pressure, and being overweight, a number may be failing to make the connection between dietary practices and these other recognized risk factors, and that further education might be needed on this relationship.

Table 10.9 Health Risk Perceptions

	Service				
Risk Factor	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Having high blood cholesterol	84.1 (1.1)	86.6 (1.0)	84.9 (1.0)	86.7 (1.1)	85.7 (0.5)
Having high blood pressure	92.1 (0.8)	93.2 (0.9)	89.1 (0.8)	93.6 (0.6)	92.5 (0.4)
Being overweight	84.9 (1.2)	88.1 (0.7)	82.3 (1.8)	87.0 (0.9)	86.2 (0.5)
Smoking cigarettes	89.2 (1.0)	92.1 (0.4)	86.1 (1.4)	93.5 (0.6)	91.0 (0.4)
Having difficulty managing stress	82.8 (1.0)	82.9 (1.8)	74.3 (2.8)	82.9 (0.9)	82.0 (0.8)
Not exercising regularly	75.8 (1.1)	69.9 (2.8)	71.1 (1.7)	73.9 (1.3)	73.0 (1.1)
Not eating a balanced diet	68.8 (1.4)	64.2 (2.8)	59.4 (2.2)	65.8 (1.6)	65.6 (1.1)
Having unprotected casual sex	93.5 (0.7)	92.8 (0.9)	90.1 (0.5)	93.0 (0.7)	92.8 (0.4)

Note: Table entries are percentages. Data are estimates of individuals who believe that the factors listed above pose a "great risk" or a "moderate risk" to a person's health.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

We also examined whether personnel who had specific health risk factors perceived these conditions or behaviors as being detrimental to their health. Except for smoking, we examined the health risk perceptions of personnel who had been told that they had the particular risk factor. Because we had other measures of smoking in the 1992 Worldwide Survey, we examined current smokers' perceptions of the health risks associated with smoking. These data are presented in Table 10.10. For each of the health risk factors listed in Table 10.10, the percentages of personnel with these risk factors who perceived these factors to pose a "great" or "moderate" risk to a person's health (i.e., for each risk factor, the sum of the percentages of the two right-hand columns) were almost identical to the percentages shown in Table 10.9 for all military personnel. This finding suggests that military personnel, regardless of their risk status, recognize the potential deleterious effects that these conditions or behaviors can have on a person's health.

10.6 Health-Related Behavior Change

In keeping with the overarching health promotion goal of encouraging individuals to adopt behaviors that reduce the risks for specific health problems or that enhance overall health and well-being, we examined the issue of health-related changes in

Table 10.10 Health Risk Perceptions and Identified Risk Factors, Total DoD

		Health Risk Perception			
Risk Factor	N	No Risk	Slight Risk	Moderate Risk	Great Risk
High blood cholesterol	2,149	0.1 (0.0)	12.0 (1.2)	36.4 (1.7)	51.5 (1.8)
High blood pressure	1,404	0.3 (0.1)	6.7 (0 9)	22.2 (1.8)	70.9 (2.1)
Overweight	1,455	1.7 (0.7)	14.8 (1.6)	48.6 (2.3)	34.9 (2.1)
Current smoker*	5,318	0.9 (0.2)	15.1 (1.0)	42.4 (1.0)	41.6 (0.9)
Difficulty managing stress	1,001	0.9 (0.4)	11.1 (1.8)	39.3 (2.3)	48.6 (3.0)
Lack of regular exercise	1,036	2.4 (0.7)	25.2 (3.4)	47.3 (2.5)	25.2 (2.3)
Poor eating habits	1,945	1.9 (0.5)	28.6 (2.0)	43.3 (2.1)	26.2 (1.9)
Risky sexual behavior	270	0.2 (0.1)	6.7 (2.5)	13.4 (3.0)	79.7 (4.3)

Note: Table entries are percentages of those with an identified risk factor who perceive different levels of risk associated with that risk factor. N's are unweighted counts of respondents who had been identified as having a particular risk factor.

*Smoker in the past 30 days.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

behavior that military personnel made in the past year. Specifically, we examined a specific set of behavior changes that personnel may have undertaken, health-related behavior change in response to participation in health screening or health education activities, and behavior change among personnel who were identified as having specific health risk factors.

10.6.1 Specific Behavior Changes

We asked 1992 Worldwide Survey respondents whether they had made any of the following specific behavior changes in the past year in order to improve their health:

- dieting to lose weight,
- cutting down on salt or sodium,
- exercising,
- stopping smoking, and
- cutting down on their use of alcohol.

Findings on the percentages of personnel making each of these behavior changes are shown in Table 10.11. Approximately 40% of personnel in the total DoD and in each of the Services indicated that they had cut down on their use of alcohol in the past year, and approximately 45 to 50% of personnel cut down on sodium or dieted to lose weight; however, the percentage of Marine Corps personnel who cut down on their sodium intake in the past year (38.1%) was somewhat lower than the corresponding rates in the total DoD and the other Services (46.4% to 51.0%). Overall, for the total DoD, 83% of personnel indicated that they exercised to improve their health. This is a much higher figure than the 64% who engaged in the kinds of strenuous exercise that are important for improving or maintaining cardiovascular fitness (Table 10.3). This finding suggests that approximately 20% of military personnel may think they are getting adequate exercise but actually have not been engaging in the kinds of regular strenuous exercise that can improve their cardiovascular fitness.

Similarly, with regard to the other behavior changes described above, it is not possible to determine from the survey data the extent, adequacy, duration, and effectiveness of these behavior changes. For example, a number of personnel may have cut down on their sodium intake, but their daily intake may still have been above recommended dietary levels. Similarly, individuals may have changed their behavior at some time during the past year for the short term but may not have made lasting changes. In addition, these data described above were based on individuals' perceptions

Table 10.11 Specific Behavior Changes Undertaken to Improve Health, Past 12 Months

Activity	N	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Dieting to lose weight	13,357	52.7 (1.5)	50.9 (2.1)	41.7 (1.5)	55.3 (1.4)	51.8 (0.9)
Cutting down on sodium	14,404	46.4 (1.4)	47.1 (2.5)	38.1 (1.8)	51.0 (1.3)	47.1 (1.0)
Exercising	15,484	85.9 (1.1)	76.0 (4.8)	89.7 (1.2)	83.8 (1.1)	82.7 (1.8)
Quitting smoking	6,028					
Any attempt		51.7 (2.1)	47.0 (5.7)	59.7 (2.3)	58.1 (1.8)	52.8 (2.2)
Successful attempt		11.5 (1.4)	11.8 (2.5)	16.9 (2.0)	16.3 (1.1)	13.4 (1.0)
Cutting down on alcohol	10,577	39.6 (1.4)	41.6 (2.2)	43.6 (2.2)	38.9 (1.0)	40.5 (0.8)

Note: Table entries are percentages making the behavior change. N's are unweighted counts of respondents answering something other than "doesn't apply" to Question 91, except for smoking. N's for smoking are unweighted counts of past-year smokers who indicated whether they made a serious attempt to quit in the past year.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

that they had changed their behavior. Thus, some personnel may honestly have believed that they changed their behavior, when, objectively speaking, they had not.

Behavior change among smokers is probably more clear-cut than perceptions of other behavior change, because the behavior change in question (i.e., smoking cessation) is an absolute one, rather than one of degree; either one has been smoking or one has not. As indicated in Table 10.11 and Table 6.9, over half of all personnel who were smokers in the past year had made a serious attempt to quit smoking (i.e., they went a week or more without smoking), but only 13.4% of them actually quit altogether. These data underscore the fact that a majority of smokers were sufficiently motivated to make an attempt to quit in the past year, but only one out of four actually succeeded. Thus, planners may need to consider what, if anything, can be done to improve the success rate among smokers who try to quit, as well as to encourage smokers to try to quit again, if they had not succeeded in their earlier attempts.

10.6.2 Screening/Education and Behavior Change

Findings on health-related behavior change related to participation in health screening or education activities are shown in Table 10.12. The estimates shown in Table 10.12 are based on the self-reports of those respondents who actually participated in these different activities. Generally speaking, higher percentages of personnel who participated in various educational activities indicated behavior change, compared to the percentages of personnel indicating behavior change as a result of their participation in health screening activities. In particular, approximately 60% of Air Force personnel who participated in nutrition education activities indicated that they changed their behavior as a result, and about 54% of Marine Corps personnel indicated behavior change as a result of participation in cancer prevention or awareness activities.

As stated previously, however, it appears that only the Army administers a formal Health Risk Appraisal (HRA) to its personnel. One possible hypothesis for the similar percentages observed for other Services for behavior change due to receipt of a "Health Risk Appraisal" may be that these personnel changed their behavior due to receipt of some other assessment of health risks or feedback concerning health risks that was not a formal HRA.

Although these results appear to suggest that participation in educational activities has been more effective in encouraging health-related behavior change among military personnel, smaller percentages of personnel actually participated in these educational activities, compared to the percentages of personnel who participated in the different health screening activities (Table 10.2). Thus, the group of personnel who participated in these educational activities may have been a more select group, in terms of either their motivations to change, or their need to change their behavior.

Table 10.12 Changes in Health Behavior Due to Participation in Screening or Education

Activity	N	Service				
		Army	Navy	Marine Corps	Air Force	Total DoD
Blood pressure check	11,545	17.9 (1.3)	12.6 (1.0)	11.5 (0.6)	12.4 (0.9)	14.0 (0.6)
Cholesterol check	6,825	31.4 (1.2)	27.3 (2.6)	26.6 (3.9)	30.9 (1.5)	30.0 (1.0)
Personal fitness assessment[a]	4,302	26.3 (1.8)	25.8 (3.1)	24.8 (3.3)	32.3 (2.5)	27.7 (1.4)
Health Risk Appraisal (HRA)	2,333	22.7 (1.8)	20.1 (3.0)	20.3 (7.2)	26.3 (3.0)	23.0 (1.3)
Nutrition education or counseling	1,802	46.3 (2.6)	41.3 (6.4)	40.9 (4.3)	60.1 (3.0)	48.0 (2.5)
Back injury prevention class	1,438	48.2 (6.7)	41.7 (2.4)	47.9 (7.5)	47.7 (4.1)	44.8 (2.2)
Cancer prevention/ awareness class	470	23.1 (2.4)	17.3 (3.0)	53.7 (7.5)	+ (+)	23.3 (1.9)
Stress management class	1,962	35.8 (3.0)	40.8 (6.2)	43.5 (5.6)	45.3 (3.6)	39.4 (2.6)
Sexually transmitted disease education or counseling	2,216	25.4 (2.7)	37.2 (5.5)	39.7 (3.9)	45.4 (5.4)	33.1 (2.5)

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages making behavior changes due to participation in a particular activity. N's are unweighted counts of respondents who engaged in the activity.

[a]Does not include annual required personal fitness test.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Furthermore, readers should be aware that respondents were asked whether they made any changes in their behavior as a result of their participation in these activities, and not what specific kinds of changes they made as a result of participation. Additional study will be needed to determine what kinds of changes result from participation in these different activities, and the duration of the change.

10.6.3 Specific Risk Factors and Behavior Change

In Table 10.13, we present findings on specific behavior changes made by personnel who had been identified as having various health risk factors. Specifically, we assessed whether personnel who had been told by a health professional in the past year that they had high blood pressure had taken any of the following actions to improve their health: (a) dieting to lose weight; (b) cutting down on salt or sodium in their diet; (c) exercising; (d) stopping smoking; or (e) cutting down on their consumption of alcohol. Similarly, we examined whether people who were identified as being overweight had

Table 10.13 Specific Behavior Changes and Identified Risk Factors

		Service				
Perception	N	Army	Navy	Marine Corps	Air Force	Total DoD
High blood pressure[a]	1,389	90.5 (2.3)	82.9 (5.8)	+ (+)	93.1 (2.1)	89.0 (2.4)
Overweight[b]	1,449	94.8 (1.4)	93.4 (1.6)	99.9 (0.1)	97.3 (0.8)	95.3 (0.8)
Smoker, told to quit	2,647					
Any attempt[c]		44.9 (2.9)	35.6 (6.6)	47.5 (4.3)	48.0 (2.7)	43.2 (2.7)
Successful attempt[d]		3.6 (0.6)	2.9 (1.6)	0.7 (0.2)	4.3 (1.0)	3.3 (0.6)
Inadequate exercise[e]	1,028	61.9 (4.9)	42.1 (6.4)	88.9 (4.8)	38.5 (4.7)	46.7 (3.1)

Note: Table entries are percentages of respondents with identified risk factors who had made specific health behavior changes in the past 12 months. N's are unweighted counts of respondents with a particular risk factor.

[a]Identified as having high blood pressure and had dieted, cut down on sodium, exercised, stopped smoking, or cut down on alcohol in the past year.

[b]Identified as being overweight and had dieted, exercised, or cut down on alcohol in the past year.

[c]Smoker told to quit who had attempted to quit in the past year.

[d]Smoker told to quit who had successfully quit in the past year.

[e]Identified as not maintaining an adequate exercise program and, in the past 30 days, had engaged in strenuous physical activity for 20 minutes or longer, 3 days a week or more.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

dieted, exercised, or cut down on alcohol; whether personnel who had been told to quit smoking had actually stopped smoking for some period of time; and whether personnel who were told in the past 30 days that they were not maintaining an adequate exercise program had engaged in strenuous physical activity for 20 minutes or more, at least 3 days a week.

Approximately 90% or more of personnel in the total DoD who were identified as having high blood pressure or were encouraged to lose weight made at least one of the behavior changes described above, with similar percentages occurring across the different Services. In comparison, the relevant Healthy People 2000 objective is to increase to at least 90% the proportion of people with high blood pressure who are taking action to control their blood pressure (PHS, 1991). Thus, it would appear that DoD and the Services are either very close to, or are slightly exceeding this objective, at least among personnel who were identified in the past year as having high blood pressure. Moreover, we did not ask respondents whether they had been taking medication in the past year to control their blood pressure. Had such an item been included in the 1992 Worldwide Survey, it is quite likely that the total DoD and all four Services would have exceeded this 90% objective among personnel who had been identified in the past year as having high blood pressure. What cannot be determined from 1992 Worldwide Survey data, however, is the proportion of individuals who were identified as having high blood pressure over a year ago who have been taking action to control their blood pressure.

Less than half of personnel in the total DoD, the Navy, and the Air Force who were told they were not exercising adequa engaged in regular strenuous exercise in the past month, but a majority of Army personnel in need of more rigorous exercise, and nearly 90% of Marine Corps personnel in this category did. However, the larger observed percentages of personnel who had high blood pressure or were overweight and who subsequently made some behavior change could also have been due to a larger number of options for behavior change, any of which would have caused them to be classified as having made a change in their behavior. In addition, it was beyond the scope of this survey to assess what kinds of specific changes that health professionals had recommended that individual personnel make in order to control their blood pressure or weight.

Of the smokers in the total DoD who had been told by a health professional to quit, less than half (43.2%) made a serious attempt to quit, with the individual Services having similar percentages. Interestingly, however, only slightly more than 3% of the smokers in the total DoD who were told to quit smoking actually succeeded, and the quit rate was less than 5% in all four Services. In comparison, over half of all of the smokers in the total DoD and in all of the Services except the Navy made a serious attempt to quit smoking in the past year (Tables 6.11 and 10.11), regardless of whether they had been advised to quit, and approximately 13% of smokers in the total DoD succeeded.

Further study will be needed to determine the underlying reasons for these lower percentages of attempts to quit and success in quitting among smokers who had been advised by a health professional to quit. There are several possible reasons for the differences. One reason is that personnel who were advised by a health professional to quit had less motivation or desire to quit and were thus less likely to succeed than personnel who attempted to quit without being advised by a health professional. Another possibility is that the form and content of the "stop smoking" message being delivered by health professionals in the military is not effective. Health professionals may be delivering a message in passing, but not emphasizing its importance or asking for a commitment from the person to try to quit. A third reason is that health professionals' advice to quit smoking may not be an important motivating factor compared to other possible motivating factors. With regard to the latter issue, further study is needed not only on motivations for smoking (as in Section 6.6), but also on motivations for smokers in the military to quit.

10.7 Overlap of Substance Use

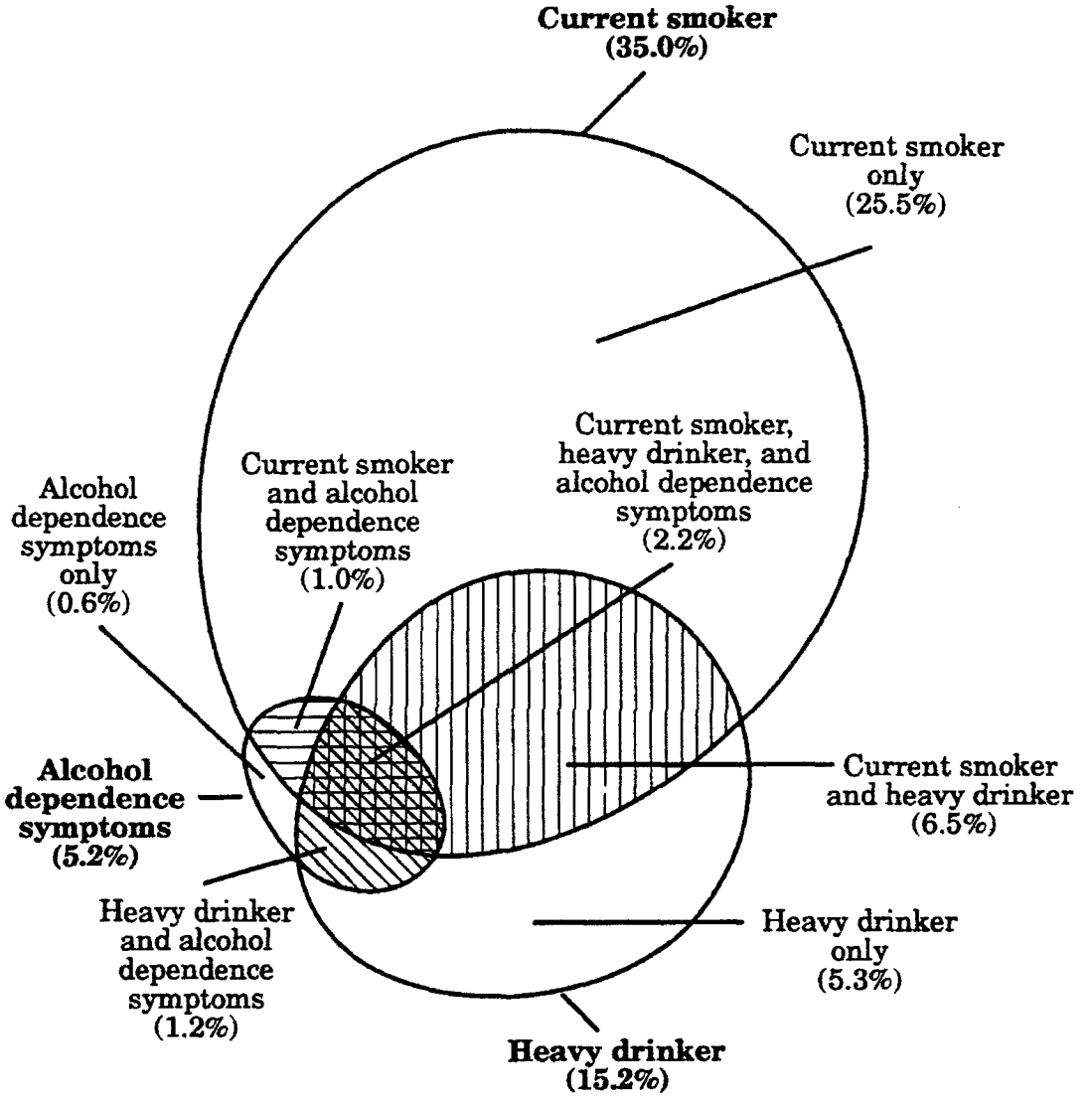
Many people use more than one substance (alcohol, other drugs, and tobacco), and the likelihood of using any particular substance is greater for those who use other substances. Previous studies have documented the combined (simultaneous) and concurrent (same time period, but not necessarily simultaneous) use of alcohol and other drugs, and alcohol and cigarettes. Because health risks and performance deficits are greater for those who use more than one substance, this is an important consideration.

In earlier chapters, we discussed separately the extent of heavy drinking, symptoms of alcohol dependence, and cigarette smoking. In this section, we examine the overlap among personnel in these three groups. We did not include an assessment of the overlap of illicit drug use with these other behaviors or conditions because of the relatively low prevalence of drug use among military personnel.

Figure 10.3 presents a schematic view of the relationship among heavy drinkers, those who showed symptoms of alcohol dependence, and those who were cigarette smokers. Overall, 42.3% of all military personnel smoked cigarettes, drank heavily, or showed symptoms of alcohol dependence. The majority were smokers only. A quarter of DoD personnel (25.5%) smoked but were not heavy drinkers or showed no signs of alcohol dependence. An additional 8.7% of military personnel were smokers and heavy drinkers, and another 1.0% were smokers, were heavy drinkers, and showed signs of alcohol dependence.

Taken together, these estimates indicate that 35.2% of those in the military smoked and slightly more than a quarter of smokers (26.6%) were heavy drinkers or showed signs of alcohol dependence. (This estimate of current cigarette smokers differs

Figure 10.3 Percentage and Overlap of DoD Personnel Who Were Current Cigarette Smokers, Were Heavy Drinkers, and/or Showed Alcohol Dependence Symptoms



Heavy drinker, alcohol dependence symptoms, or current smoker = 42.3%

Personnel in two or more categories = 10.9% of DoD

Note: Percentages for the individual segments may not sum to the population prevalence estimates shown in boldface due to missing data.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

slightly from the 35.0% presented in Chapter 3 due to incomplete data on smoking and alcohol use for some respondents.) For the military as a whole, 15.2% were heavy drinkers. However, among smokers, 24.7% were heavy drinkers. Conversely, for the entire DoD, we found that 35.2% were smokers. Among those who were heavy drinkers or who showed alcohol dependence symptoms, 64.9% also smoked. Compared to nonsmokers, smokers were two-thirds more likely to drink heavily and/or show symptoms of dependence. Personnel who were heavy drinkers or showed symptoms of dependence were nearly twice as likely to smoke as those who did not drink heavily or demonstrate alcohol dependence symptoms.

Among heavy drinkers (15.2% of military personnel), over a fifth (22.4%) showed some signs of alcohol dependence. However, there was a group of personnel showing symptoms of alcohol dependence who apparently did not fall into the category of heavy drinkers. One in twenty military personnel (5.2%) had alcohol dependence symptoms and over a quarter of personnel who showed these symptoms (1.6% of all DoD) were not heavy drinkers. In considering the definition we have used for dependence, one that relies heavily on the physical manifestations of consuming large amounts of alcohol (such as blackouts and the shakes), and our definition of heavy drinking (weekly consumption of five or more drinks), we can speculate that the subset of those who showed symptoms of alcohol dependence, but who were not heavy drinkers consisted primarily of binge drinkers. Binge drinkers are at particular risk for drinking and driving. One study of adults in Michigan found that 93% of drinking drivers reported binge drinking, yet 70% of this group consumed less than 14 drinks per week (Anda et al., 1987). Researchers found similar results among Massachusetts college students, where binge drinkers--defined as those who drank at least five drinks in a row in the past 2 weeks--were much more likely to drink and drive, ride with an impaired driver, damage property, get into trouble with police, or encounter difficulty with school (Wechsler & Isaac, 1992).

Understanding the overlap among groups is also important in planning intervention or treatment programs for military personnel. The data in Figure 10.3 suggest that multiple types of interventions/programs will be needed to reduce smoking, heavy drinking, and alcohol dependence. The greatest overlap is between heavy alcohol use and dependence symptoms, as expected. Reducing heavy alcohol use among this group should reduce dependence symptoms accordingly. However, heavy drinkers who also have dependence symptoms may require different approaches than heavy drinkers who do not have such symptoms. Similarly, smoking cessation interventions aimed at smokers only may have more success than the same programs aimed at smokers who are also heavy drinkers.

10.8 Summary

In addition to efforts designed to reduce substance use among military personnel, DoD policy on health promotion has been directed toward improving the health of military personnel by encouraging, where needed, the adoption of behaviors directed toward cardiovascular disease risk reduction, better nutrition, stress management, and hypertension prevention. We also examined the issues of military personnel's participation in health screening activities, condom use, health risk factors, and health-related behavior change. We concluded with a discussion of the overlap of heavy alcohol use, symptoms of alcohol dependence, and cigarette smoking among military personnel.

10.8.1 Health Problems

As in 1985 and 1988, we asked 1992 Worldwide Survey respondents about the number of illnesses that they experienced in the past year. Specifically, we asked about the number of times in the past year that personnel had symptoms such as feeling flushed or sweaty, or having a runny nose or eyes, chills, nausea or vomiting, stomach cramps, diarrhea, muscle pains, or severe headaches (see Figure 10.1).

- In 1992, military personnel had an average of 3.05 illnesses with any of these symptoms. While this average was lower than the 1988 average of 3.40 illnesses, it was still higher than the 1985 average of 2.45.

10.8.2 Health Behaviors

In keeping with the broader health promotion focus that has been developing across the Worldwide Survey series since 1985, we designed the 1992 Worldwide Survey to examine a variety of health behaviors among military personnel, including participation in health screening or education activities, exercise, eating habits, stress and coping, and condom use. Where relevant, we also compared 1992 Worldwide Survey findings with corresponding Healthy People 2000 objectives.

- Approximately two-thirds of all military personnel had their blood pressure checked in the past year, and 36.0% had their cholesterol checked (Table 10.2). In comparison, the Healthy People 2000 objectives for blood pressure and cholesterol screening were for at least 90% of adults to have had their blood pressure checked in the past 2 years and be able to state whether it was normal or high, and for at least 75% of adults to have had their cholesterol checked in the past 5 years.

- Compared to blood pressure and cholesterol screening, smaller percentages of military personnel received personal fitness assessments in addition to any required personal fitness tests (26.6%), and approximately one in eight (12.4%) had a Health

Risk Appraisal (HRA) in the past year (Table 10.2). In addition, participation of personnel in various health education activities ranged from 3.1% who participated in cancer prevention and awareness activities, to 15.8% who received education about sexually transmitted diseases.

- Over half of personnel in the total DoD and in all four Services engaged in the past month in some form of strenuous physical activity at least 3 days per week for 20 minutes or more (Table 10.3). Thus, the military is already greatly exceeding the Healthy People 2000 objective of at least 20% of adults engaging in vigorous physical activity 3 or more days per week for 20 minutes or more.

- A majority of military personnel regularly ate low-fat, low-cholesterol foods, such as low-fat dairy products, high-fiber grains, fruit, and green or yellow vegetables (Table 10.4). However, sizable proportions of personnel (29 to 44%), also regularly consumed foods high in fat or cholesterol. This latter finding suggests that further effort may be needed to encourage healthier eating habits in the military.

- High percentages of military personnel (62% to 91%), regardless of their perceived levels of work-related stress, used a variety of "functional" behaviors to cope with stress, including: thinking of a plan to solve the problem, seeking social support, exercising, and engaging in leisure time activities (Table 10.5). However, nearly 60% of personnel under perceived high levels of work-related stress used food to cope with stress, approximately one third (32.9%) smoked cigarettes when they felt stressed, and 28.3% used alcohol to cope with stress. Only about 5% of personnel under perceived high levels of work-related stress sought professional help.

- An estimated 50.2% of all sexually active unmarried military personnel used a condom during their last sexual encounter (Figure 10.2). This level currently meets the Healthy People 2000 objective of 50% or more of unmarried individuals having used condoms during their last episode of sexual intercourse.

- Of sexually active unmarried personnel in the individual Services, 55.2% in the Army, 50.5% in the Navy, 45.0% in the Marine Corps, and 47.1% in the Air Force used a condom the last time they had sexual intercourse (Table 10.7).

- Unmarried male personnel (51.8%) were more likely to have used a condom than unmarried females (43.7%) were to have insisted that their partners use one, and unmarried personnel ages 20 and younger were generally more likely to have used a condom (53.5%) than were unmarried personnel ages 35 and older (43.2%) (see Table 10.6).

10.8.3 Health Risk Factors

One of the major goals of health promotion programs is to identify individuals who are at increased risk for adverse health outcomes, so they can be encouraged to adopt behaviors that improve their current health status and enhance future status. Early identification of risk factors is important for preventing future health problems and disability (see Table 10.8).

- In the past year, approximately 10% of all military personnel were identified by a health professional as having high blood cholesterol; 7.9% were identified as having high blood pressure; 9.0% were identified as being overweight; 12.0% were advised to change their eating habits; and 15.5% were advised to quit smoking.

- Lower percentages (2.7% to 7.3%) of military personnel were advised to change the way they managed stress, to begin a more strenuous exercise program, or to change their sexual behavior.

- These figures should be considered to be conservative estimates of the true prevalence of these problems in the military.

- Even though personnel may have been identified as having particular health risk factors, 1992 Worldwide Survey data suggest that they nevertheless perceived that there were potentially serious health consequences associated with these risk factors (Tables 10.9 and 10.10).

10.8.4 Health-Related Behavior Change

In the 1992 Worldwide Survey, we examined specific health-related changes in behavior that military personnel had made. In particular, we examined behavior changes that personnel made in response to participation in health screening or education activities and changes in response to having been identified as having a specific health risk factor.

- In the past year, approximately 40 to 50% of military personnel had cut down on alcohol, had cut down on sodium, or had dieted to lose weight, and over 80% had exercised regularly (Table 10.11). Over half of all smokers in the military made a serious attempt to stop smoking in the past year, but only 13.4% succeeded.

- Approximately 90% of personnel who were identified as having high blood pressure or were advised to lose weight in the past year took some action to change their behavior (Table 10.13). This percentage of personnel taking action to control their blood pressure matches the Healthy People 2000 objective for adults with high blood pressure taking action to control their blood pressure.

- In comparison to over 50% of all smokers in the total DoD having made a serious attempt to quit smoking in the past year, less than half of all smokers who were advised by a health professional to quit attempted to do so, and less than 5% succeeded (Tables 10.11 and 10.13).

10.8.5 Overlap of Substance Use

Finally in this chapter, we examined the overlap of cigarette smoking, heavy alcohol use, and alcohol dependence among military personnel (see Figure 10.13). Previous studies (e.g., Istvan & Matarazzo, 1984) had indicated that these behaviors were not independent.

- An estimated 42.3% of military personnel smoked cigarettes, drank heavily, or showed symptoms of dependence. The majority were smokers only.

- Among military personnel, 25.5% smoked but did not drink heavily or have symptoms of alcohol dependence; an additional 8.7% were smokers and heavy drinkers; and another 1.0% smoked, drank heavily, and showed signs of alcohol dependence.

- The large majority of current smokers (over 75%) in the military were not heavy drinkers. However, the prevalence of heavy alcohol use among military personnel who were also smokers (24.7%) was higher than the overall prevalence of heavy alcohol use in the total DoD (15.2%).

- Smokers were more likely than nonsmokers to drink heavily or to show signs of alcohol dependence. Cigarette smokers were two-thirds more likely than nonsmokers to drink heavily or show signs of alcohol dependence.

- Among personnel who were heavy drinkers or were alcohol dependent, 64.9% were also smokers. Personnel who were heavy drinkers or alcohol dependent were twice as likely to smoke as were personnel who were not.

Data from the 1992 survey provide benchmark information to help monitor the practice of a variety of health behaviors among military personnel. Taken together, the findings suggest that military personnel as a whole were highly motivated to make changes in behaviors that were designed to improve their health, particularly if they had been identified by a health professional as having a specific risk factor, such as high blood pressure or high blood cholesterol. Moreover, these findings suggest that smoking may be a more difficult behavior for affected military personnel to change than it may be for them to make changes in some of the other behaviors. Further study, however, will be needed to determine what kinds of changes personnel have made, how effective those changes were, and how permanent the changes were. Further study will also be needed to examine reasons why smokers who were advised by a health professional to quit

appeared less likely to have tried to quit or to have succeeded than were smokers in the military in general.

Findings also confirmed the interrelationships between heavy alcohol use, alcohol dependence symptoms, and cigarette smoking among military personnel. It appears that personnel who are identified first as being heavy drinkers or show symptoms of alcohol dependence will very likely need intervention to help them stop smoking as well, but most personnel who are first identified as being smokers will not need intervention to reduce heavy drinking.

11. KNOWLEDGE AND ATTITUDES ABOUT AIDS

In this chapter we examine knowledge and attitudes of military personnel about acquired immune deficiency syndrome (AIDS) and the virus that is the cause of the syndrome, human immunodeficiency virus (HIV). We recognize the distinction between being infected with the virus (HIV-infected) and exhibiting the end result of the infection (AIDS). However, common usage is to refer to HIV as the AIDS virus, a convention that we followed in the questionnaire to ensure understandability. In this chapter we consider knowledge about HIV infection and AIDS, such as how the virus is transmitted and what the medical consequences of infection are, including whether AIDS can be treated. We also examine the relationship between beliefs about condom effectiveness and condom usage, and compare knowledge and beliefs of civilians and military personnel.

11.1 Importance of the Issue

The public health model, originally developed for infectious diseases, identifies three factors in the development of a disease--the agent, the host, and the environment. Extensive and complete public knowledge about the agent-host-environment relationship is not critical for many infectious diseases because programs of sanitation or eradication, immunization, and, in extreme cases, quarantine, can effectively protect the public health. Sanitation and eradication programs disrupt the disease transmission process by directly attacking disease agents or by changing environmental conditions. Using pesticides and eliminating breeding pools of standing water, for example, reduce the number of mosquitoes that carry yellow fever, and purifying water supplies controls the amoebic agent that causes dysentery. Thus, widespread public knowledge is not required about diseases that can be controlled by actions targeted at the agent and the environment. Immunization is also effective in preventing diseases and is particularly useful in eliminating the spread of diseases when virtually complete coverage of the population at risk can be assured (e.g., inoculations of all recruits during basic training). However, immunization programs depend on the development of effective vaccines.

None of these conditions holds for HIV infection. There is no known transmission agent separate from the host, there is no single environmental condition that can be altered to disrupt the transmission process, and no vaccine is available to prevent infection. Behavior change is the only method currently available for curtailing the spread of HIV. Further, for this behavior change to occur, individuals must possess accurate knowledge and hold appropriate attitudes. Thus, the major public health AIDS-prevention activity must be education aimed at informing and motivating the public so that high-risk situations and behaviors will be reduced or eliminated.

The Services have implemented AIDS-information programs to provide military personnel with the facts about HIV transmission and to dispel the rumors, half-truths,

and falsehoods that inevitably accompany the spread of any dangerous disease. Official DoD policy on identification, surveillance, and administration of personnel infected with HIV appears in DoD Directive 6485.1 (DoD, 1991) dated March 19, 1991. All Services provide education for their personnel about HIV, means of transmission of the virus, and prevention of spread of the virus. These educational programs specify the variety of ways in which infectious bodily fluids may be exchanged and try to motivate individuals to avoid high-risk situations and behaviors.

Knowledge of how infectious diseases in general are transmitted helps personnel to understand how HIV is transmitted. Most people know that some infectious agents can be transmitted from host to host through the air, by physical contact, or by contact with items handled by an infected host. Less commonly understood are infectious agents that require a special set of conditions, such as microorganisms that are always present in the environment but only rarely result in the development of disease (e.g., meningitis). HIV transmission approximates the latter situation in that it occurs under a fairly specific set of circumstances. Medical research and epidemiological findings have established how the virus can and cannot be transmitted. HIV spreads from infected persons by intercourse, either vaginal or anal, or by the introduction of infected blood (or blood products) through the skin and into the bloodstream (e.g., intravenous drug use). In addition, it can spread from an infected mother to her infant during pregnancy or at the time of birth. (HIV has been isolated in other body fluids, such as tears, saliva, and urine, but apparently the concentration in these fluids is too low to result in infection.) Breathing air containing HIV and making physical contact without exchange of bodily fluids, therefore, are not means of transmission.

Even so, the prognosis for HIV-infected persons is so dismal that many people have a natural inclination to try to protect themselves by behaving as though HIV can be transmitted as easily as viruses that cause the common cold. Thus, complete awareness about HIV transmission must include information on how the virus is <u>not</u> transmitted as well as information specifying means and mechanisms of transmission. Otherwise, and particularly under conditions such as those in the military where group living and communal dining are common and where blood transfusions among personnel are a real possibility, the potential for fear and interpersonal avoidance can interfere with accomplishment of the military's mission.

11.2 Prior Studies

A number of studies have examined knowledge and attitudes about HIV transmission and AIDS. Perhaps the most complete information comes from a set of questions that have been included in the civilian National Health Interview Survey (NHIS) since 1987. The questions on the survey about AIDS and HIV have included items on sources of information about the disease, knowledge about the virus and how it

is transmitted, and perceptions of the risk of getting the virus. In general, the NHIS results have indicated that the American public is becoming increasingly knowledgeable about general facts concerning HIV and AIDS but gaps remain about many specifics. Significant misconceptions remain about the possibility of transmission through casual contact.

In the first quarter of 1991, 29% of those queried in the NHIS reported that they knew a lot about AIDS, up 10% from the last quarter of 1990 (Hardy, 1992). Extensive efforts have been under way to educate the general population about the virus and the NHIS results indicate that the message is getting through. In this most recent NHIS, 79% of adults reported having seen public service announcements (PSAs) about AIDS on television and 42% had heard one on the radio. Media presentation of AIDS information is not limited to PSAs, as 72% reported they received information from television programs, 43% from newspaper articles, 39% from magazine articles, and 32% from radio programs. Judging from responses to several questions on the NHIS measuring general information about HIV transmission and AIDS, there is a fairly high level of general knowledge among the American public. In 1991, 92% of adults thought it was true that there was no cure for AIDS, and 95% believed that HIV could be transmitted by sexual intercourse. Regarding preventive measures, 76% of adults felt that condoms are somewhat effective or very effective in preventing transmission of HIV (Hardy, 1992).

Although the knowledge level is high among the general public about ways HIV can be transmitted, details are still lacking. For example, only 17% of the general public were aware that latex condoms and natural membrane condoms are not equally effective in preventing transmission. Misconceptions about casual transmission are also fairly widespread. For example, 27% of those responding on the 1991 NHIS thought it was very likely or somewhat likely that they could become infected by being coughed or sneezed on by someone infected with the virus. Similarly, 26% thought it was somewhat or very likely that mosquitoes could transmit the virus (Hardy, 1992).

In sum, the general public has a high level of general knowledge about transmission of HIV, a level that likely reflects both formal education programs and the large amount of attention that the virus has received in the media. However gaps in knowledge exist and significant misconceptions about casual transmission remain.

11.3 Knowledge About AIDS

Because the consequences of infection are fatal and risk-reduction behaviors are the only preventive measures currently available for AIDS, the military has an inherent interest in assessing how well military personnel understand behaviors that place them at risk, and how much they appreciate the importance of avoiding risky behaviors at all times. Therefore, we assessed military personnel's knowledge about HIV and AIDS

through a series of questions directed at (a) the methods of transmission, (b) medical consequences, (c) symptoms, and (d) treatment of the disease.

We assessed general knowledge about HIV transmission and AIDS through a series of 12 true-false questions. Table 11.1 presents the proportion responding correctly to each of the questions with footnotes indicating the correct response. The vast majority of military personnel were aware that HIV can be sexually transmitted (94.6%) and that a pregnant woman who is infected can pass it on to her baby (93.2%). These figures were uniformly high for all of the Services. Leaving aside the problem of how an individual would know whether the other person is infected, the results for sexual transmission are both reassuring and alarming--reassuring in that awareness is so widespread and alarming in that 5% of military personnel are not adequately informed, particularly with respect to the likelihood of infection as a result of having sex with an HIV-carrier. Even 5% providing incorrect responses is a surprising figure, given the military education programs and the widespread attention given to AIDS in the media.

There was also a high level of awareness that a person can be infected and not have AIDS (88.4%) and that a person with the AIDS virus can look and feel healthy (92.3%). This information is important in that military personnel need to know that protective measures should be taken with any sexual partner. Infected persons can live for years without experiencing any symptoms and may not even know they are infected; no one can determine who is and who is not infected by any external signs. Every sexual partner must be viewed as a risky partner.

Although most military personnel were aware that presently there is no cure for AIDS (89.8%), they were less knowledgeable about the fact that treatments are available to reduce symptoms (53.3%) and to extend the life of a person with AIDS (65.3%). Despite the gaps relating to the availability of ameliorative treatments, 9 out of 10 personnel knew the key piece of information, that no cure is available for AIDS.

The most alarming gap is in knowledge related to preventive measures. For example, only 83% of the military believed correctly that there is no vaccine available against AIDS. Less than half of all military personnel (42.5%) knew that natural-membrane and latex condoms are <u>not</u> equally effective against the AIDS virus. As discussed previously, these gaps are not unique to military personnel; the NHIS results indicate a similar lack of information among the population as a whole.

11.4 Beliefs About AIDS Transmission

Accurate knowledge and beliefs about how HIV is transmitted are not sufficient for preventing the spread of the virus. This knowledge must be translated into appropriate

Table 11.1 General Knowledge About AIDS, by Service

Knowledge Item	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
AIDS can damage body's natural protection[a]	92.7 (0.7)	94.9 (0.4)	92.2 (1.1)	96.4 (0.3)	94.4 (0.3)
AIDS can damage brain[a]	44.9 (1.3)	42.4 (2.3)	41.7 (2.0)	36.8 (1.0)	41.5 (0.9)
AIDS caused by virus[a]	89.0 (0.6)	88.5 (1.5)	88.9 (1.8)	88.7 (0.7)	88.8 (0.6)
Person can be infected and not have AIDS[a]	88.5 (0.8)	88.3 (0.8)	85.8 (0.9)	89.5 (0.6)	88.4 (0.4)
Person with AIDS can pass it on through sex[a]	94.8 (0.6)	94.7 (0.6)	93.1 (0.5)	94.7 (0.5)	94.6 (0.3)
Pregnant woman with AIDS can give it to her baby[a]	93.6 (0.6)	92.7 (1.3)	94.2 (0.7)	93.1 (0.6)	93.2 (0.5)
Person with the AIDS virus can look and feel healthy[a]	92.5 (0.7)	91.3 (0.9)	91.3 (0.8)	93.4 (0.4)	92.3 (0.4)
Drugs available to extend the life of person with AIDS virus[a]	66.6 (1.3)	61.5 (3.7)	61.7 (2.3)	69.1 (0.8)	65.3 (1.4)
Early treatment of AIDS virus infection can reduce symptoms[a]	54.3 (1.8)	52.7 (2.6)	48.8 (1.8)	54.8 (0.9)	53.3 (1.0)
Vaccine available against AIDS[b]	81.7 (1.3)	80.0 (2.0)	82.2 (0.9)	88.0 (0.6)	83.0 (0.9)
No cure for AIDS at present[a]	89.8 (1.0)	88.8 (1.0)	87.8 (1.0)	91.6 (0.7)	89.8 (0.5)
Natural-membrane and latex condoms equally effective against AIDS virus[b]	43.7 (1.3)	43.9 (4.6)	38.0 (1.0)	41.5 (1.4)	42.5 (1.5)

Note: Table values are percentages answering correctly (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

[a]Correct answer is "true."

[b]Correct answer is "false."

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

risk-avoiding behaviors. In the first portion of this section we examine the relationship between knowledge about condom effectiveness and condom use behavior. Condom use is critical because, next to abstinence, it is the most effective method for preventing sexual transmission of the virus. Following the discussion on beliefs and condom use, we examine the extent to which military personnel are misinformed about the potential for casual transmission of HIV.

We present results for beliefs about condom effectiveness and usual condom use in Table 11.2. We have shown these results for males and females separately, with all military personnel presented in the lower third of the table. Table entries are row percentages of personnel using each type of condom and their beliefs about the relative effectiveness of natural-membrane and latex condoms.

Three general observations about condom use by military personnel from the survey are in order before we examine the relationship between beliefs about effectiveness and condom use. First, few military personnel had never had sex, a fact that underscores the potential risk that HIV presents to this population. Second, the majority of personnel did not regularly use a condom. Those who did not regularly use condoms should not be automatically considered as engaging in risky behavior, however. This group may have included those who were abstinent at that time and those who were involved in a long-term, monogamous relationship with a noninfected person. As discussed in Chapter 10, we found that among unmarried personnel, 65.5% reported regular use of condoms while only 24.6% of married personnel used them (see Table 10.6). Finally, among those who said they did use condoms, the majority used the more effective latex condom.

When we considered all military personnel, less than half (42.6%) correctly responded that the two types of condoms were not equally effective in preventing HIV transmission. A higher percentage of males (44.1%) than females (34.4%) correctly responded that there is a difference in effectiveness between the two types of condoms. This difference resulted from a higher proportion of females who answered "Don't Know" to the item. Equal percentages of males (29.1%) and females (29.5%) incorrectly responded that the two types were equally effective.

In comparing beliefs about condom effectiveness with condom use, we found that a larger percentage of those who used latex condoms were able to provide a correct response (50.7%) than any other group. This is in contrast to those who reported condom use but were unsure of what kind they used, with only 17.0% of this group responding correctly. Nearly half (47.0%) of those who were unsure of the type of condom they used responded "Don't Know" to the effectiveness question. Even though latex condom users had the highest level of knowledge, there was not a one-to-one relationship between accurate knowledge and appropriate behavior. Among the latex condom users, 31.5% incorrectly responded that the two types of condoms were equally effective and, among those who

Table 11.2 Beliefs About Condom Effectiveness and Usual Condom Use, Total DoD, by Sex

Sex/Type Condom Used	N	Effectiveness of Natural Membrane and Latex Condoms: Equally Effective	Not Equally Effective	Don't Know
Male	14,144	29.1 (1.0)	44.1 (1.0)	26.8 (0.6)
Latex	3,736	31.9 (1.7)	50.4 (1.9)	17.7 (0.9)
Natural membrane	165	54.3 (6.1)	31.1 (4.8)	14.7 (2.8)
Use condom, but don't know what kind	661	37.8 (3.3)	18.6 (1.8)	43.6 (3.3)
Do not use a condom	9,428	26.6 (1.0)	42.9 (0.9)	30.5 (0.7)
Have not had sex	154	13.6 (3.6)	46.5 (4.9)	+ (+)
Female	1,891	29.5 (2.1)	34.4 (3.8)	36.1 (2.5)
Latex	380	28.4 (3.1)	53.3 (3.2)	18.3 (3.9)
Natural membrane	29	+ (+)	+ (+)	+ (+)
Use condom, but don't know what kind	166	31.0 (3.6)	12.5 (5.3)	56.5 (7.7)
Do not use a condom	1,252	29.4 (3.3)	31.3 (3.9)	39.4 (2.3)
Have not had sex	64	+ (+)	36.1 (7.6)	+ (+)
Total	16,035	29.2 (1.1)	42.6 (1.4)	28.2 (0.7)
Latex	4,116	31.5 (1.4)	50.7 (1.8)	17.8 (0.9)
Natural membrane	194	54.5 (5.6)	29.7 (4.3)	15.8 (2.7)
Use condom, but don't know what kind	827	36.0 (3.1)	17.0 (2.4)	47.0 (4.2)
Do not use a condom	10,680	27.0 (1.2)	41.1 (1.4)	31.9 (0.6)
Have not had sex	218	17.1 (4.9)	43.3 (3 8)	39.6 (4.3)

Note: Table entries are row percentages of respondents using each type of condom and their beliefs about effectiveness in preventing HIV infection (standard errors in parentheses). N's are unweighted counts.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

used natural-membrane condoms, 29.7% correctly indicated that there was a difference in effectiveness.

Several explanations are possible for the apparent contradiction between knowledge and behavior with those who reported using natural-membrane condoms yet stated that there are differences in effectiveness. One possibility is that those who used natural-membrane condoms incorrectly believed that the condoms they were using were more effective than the latex type. A second explanation for the discrepancy between knowledge and behavior is confusion about the type of condom they were actually using. A third possibility is that there was a group that had a strong preference for natural-membrane condoms, a preference that was so pronounced that they continued using them despite the increased risk they pose. With the first two explanations, thinking latex condoms are less effective or not accurately distinguishing between the two types of condoms, additional educational efforts might result in the knowledge changes necessary to convince these personnel to switch to latex condoms.

Knowing how HIV is transmitted is important in avoiding infection. Likewise, in an environment such as the military that involves close work situations, group eating arrangements, and communal living, it is also important for personnel to appreciate that the virus is not transmitted by way of casual contact. Thus, the questionnaire asked a series of questions about the likelihood of getting the AIDS virus from various types of exposures. Along with questions about condom effectiveness, we asked respondents to rate the likelihood of transmission of HIV by various situations, with many of the questions targeted at the possibility of casual transmission (see Table 11.3).

As with the question on sexual transmission, the vast majority of respondents (93.9%) correctly stated that it is "Very Likely" or "Somewhat Likely" that a person would become infected by sharing needles with someone who had the virus. Air Force personnel were the most likely to respond positively (96.0%), with the remainder of the Services approximately the same, around 93.0%. The next two most likely methods cited were blood transfusions (68.7%) and being cared for by a health care worker with the AIDS virus (57.5%). Although the blood supply has been safe since 1985 when regular testing of donations began, transmission by this route has occurred in the past. The question (adopted from the NHIS) does not include a clause about blood that is tested, so we found it difficult to interpret responses to this item. Technically, it is possible to become infected through a blood donation but with universal testing of the blood supply, the possibility is nil.

As noted in the previous paragraph, over half of the respondents (57.5%) indicated that being cared for by an infected health care worker was a possible source of infection. In the past 2 years there have been isolated reports of transmission through contact with a health care worker who had the virus and many public discussions about the issue of

Table 11.3 Beliefs About How AIDS Is Transmitted, by Service

Item	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Working with someone with AIDS virus	10.0	(0.6)	10.9	(1.1)	9.8	(1.2)	8.1	(0.4)	9.7	(0.4)
Eating in dining facility where cook has AIDS virus	24.9	(1.0)	26.0	(2.1)	31.1	(2.2)	24.3	(1.3)	25.7	(0.8)
Sharing eating utensils with someone with AIDS virus	24.2	(0.8)	24.9	(1.1)	28.9	(1.8)	26.9	(0.7)	25.7	(0.5)
Using public toilets	12.7	(0.9)	9.7	(0.7)	15.9	(2.1)	11.6	(0.8)	11.8	(0.5)
Sharing needles with someone with AIDS virus	93.2	(0.7)	92.7	(1.8)	93.9	(0.6)	96.0	(0.4)	93.9	(0.6)
Coughing or sneezing	22.6	(0.7)	21.9	(0.8)	24.0	(3.0)	24.5	(1.0)	23.1	(0.6)
Mosquitoes or other insects	27.8	(1.4)	28.7	(2.2)	30 3	(0.9)	26.0	(1.2)	27.8	(0.9)
Being cared for by health care worker with AIDS virus	58.7	(1.3)	55.8	(0.9)	60.0	(2.5)	57.2	(1.1)	57.5	(0.6)
Getting blood transfusion	70.4	(1.3)	70.0	(2.2)	70.7	(1.4)	64.9	(1.6)	68.7	(0.9)

Note: Table values are percentages (with standard errors in parentheses). Data are percentages who believe that AIDS transmission is "very likely" or "somewhat likely" in the ways mentioned. Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

infected workers. Even though the possibility of becoming infected through this mechanism is extremely remote and only a few cases have been documented, transmission through health care worker contact was seen as a real possibility across all Services.

As with the civilian population, there was a significant amount of misconception about the risks of casual contact. A quarter of all military personnel believed that eating in a dining facility where the cook was infected (25.7%), sharing eating utensils with someone who was HIV-positive (25.7%), or being coughed or sneezed on by someone with the virus (23.1%) posed a risk. Personnel expressed less concern about transmission from working with someone who was infected (9.7%) or using public toilets (11.8%).

DoD policy states that HIV infection alone may not be the basis for forcibly separating anyone from the Services. The relatively high rate of concern that personnel expressed about casual contact suggests that it would be difficult for a person known to be infected to work and live in close proximity to other personnel without encountering some kind of negative reaction. This finding underscores the need for absolute confidentiality of individual test results.

Misconceptions were not limited to the possibility of becoming infected through casual contact with someone who is HIV-positive. Over a quarter of military personnel (27.8%) incorrectly indicated that mosquitoes or other insects are a possible method of transmission.

In summary, the vast majority of military personnel recognized the risks of HIV infection through sexual contact and sharing needles. Nevertheless, large gaps in knowledge remain in how the virus is not transmitted. These gaps have the real potential for undermining the effectiveness of any individuals who are known to be or suspected of being infected. Although the seroconversion rate in the military has dropped to 0.40 per 1,000 (Burrelli, 1992), there are military personnel who are HIV-positive. Further educational efforts should work to counteract inaccurate information and to dispel the misconceptions about any risks involved in working or living with an infected person.

DoD amended its health education policy in 1991 to require education targeted at HIV transmission. Previously, education policy was left to each of the Services. As we demonstrate in the next section, comparisons between military personnel and the civilian population help assess how effective these education efforts have been.

11.5 Military and Civilian Comparisons

Many of the items relating to HIV transmission and AIDS used in the 1992 Worldwide Survey were drawn from the National Health Interview Survey (NHIS). Using the same questions as the NHIS permits comparisons between military and civilian populations on knowledge and beliefs related to AIDS. The final 1991 NHIS results were not available at the time this report was prepared so the comparisons are based on the 1990 NHIS. Because of differences in the sociodemographic composition of civilian and military populations, we standardized civilian responses to the NHIS to the entire DoD population by age, race/ethnicity, and education. (See Appendix F for a more detailed discussion of standardization procedures.)

Table 11.4 presents comparisons between civilians and the military, both the entire DoD as well as individual Services, on knowledge related to AIDS. Although a number of individual items showed significant differences between the military and civilian populations (due to the small standard errors associated with the estimates), military personnel and civilians had similar high levels of knowledge about AIDS. Over 85% of both groups responded correctly in general to six of the nine questions that were common to both the 1990 NHIS and the 1992 Worldwide Survey. Knowledge levels for both groups were not as high on questions relating to (a) whether AIDS can damage the brain, one area where a much larger percentage of civilians responded correctly compared to military personnel (69.0% vs. 41.5%); (b) the availability of ameliorative drug treatments (76.0% vs. 65.3%); and (c) the lack of a vaccine (82.8% vs. 83.0%). The first two items, where

Table 11.4 General Knowledge About AIDS, Military Personnel and Civilians: Standardized Comparisons

Item	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
AIDS can reduce body's natural protection[a]	92.6 (0.3)	94.4 (0.3)[c]	92.7 (0.7)	94.9 (0.4)[c]	92.2 (1.1)	96.4 (0.3)[c]
AIDS can damage brain[a]	69.0 (0.5)	41.5 (0.9)[c]	44.9 (1.3)[c]	42.4 (2.3)[c]	41.7 (2.0)[c]	36.8 (1.0)[c]
AIDS caused by virus[a]	90.8 (0.3)	88.8 (0.6)[c]	89.0 (0.6)[c]	88.5 (1.5)	88.9 (1.8)	88.7 (0.7)[c]
Person can be infected and not have AIDS[a]	86.5 (0.4)	88.4 (0.4)[c]	88.5 (0.8)[c]	88.3 (0.8)[c]	85.8 (0.9)	89.5 (0.6)[c]
Any person with AIDS virus can pass it on through sex[a]	97.6 (0.2)	94.6 (0.3)[c]	94.8 (0.6)[c]	94.7 (0.6)[c]	93.1 (0.5)[c]	94.7 (0.5)[c]
Pregnant women with AIDS virus can give it to her baby[a]	97.6 (0.2)	93.2 (0.5)[c]	93.6 (0.6)[c]	92.7 (1.3)[c]	94.2 (0.7)[c]	93.1 (0.6)[c]
Person with the AIDS virus can look and feel healthy[a]	--[d] --[d]	92.3 (0.4)	92.5 (0.7)	91.3 (0.9)	91.3 (0.8)	93.4 (0.4)
Drugs are available to extend the life of person with AIDS virus[a]	76.0 (0.5)	65.3 (1.4)[c]	66.6 (1.3)[c]	61.5 (3.7)[c]	61.7 (2.3)[c]	69.1 (0.8)[c]
Early treatment of AIDS virus infection can reduce symptoms[a]	--[d] --[d]	53.3 (1.0)	54.3 (1.8)	52.7 (2.6)	48.8 (1.8)	54.8 (0.9)
Vaccine is available against AIDS virus[b]	82.8 (0.4)	83.0 (0.9)	81.7 (1.3)	80.0 (2.0)	82.2 (0.9)	88.0 (0.6)[c]
No cure for AIDS at present[a]	93.4 (0.3)	89.8 (0.5)[c]	89.8 (1.0)[c]	88.8 (1.0)[c]	87.8 (1.0)[c]	91.6 (0.7)[c]
Natural membrane and latex condoms are equally effective against AIDS virus[b]	--[d] --[d]	42.5 (1.4)	43.7 (1.3)	43.9 (4.6)	38.0 (1.0)	41.5 (1.4)

Note: Table entries are percentages answering correctly (with standard errors in parentheses). Civilian data have been standardized to the military data by age, race/ethnicity, and education. Data for the individual Services are unstandardized.

[a]Correct answer is "true."
[b]Correct answer is "false."
[c]Significantly different from the civilian at the .05 level.
[d]Item not in the 1990 National Health Interview Survey.

Civilian data source: National Health Interview Survey, 1990.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

civilians were more likely to provide correct responses, are not essential information for preventing infection.

Three of the AIDS knowledge items used in the 1992 Worldwide Survey were not on the 1990 NHIS, so standardized comparisons were not possible. However, these items were added to the 1991 NHIS, and preliminary tabular data were available (Hardy, 1992) at the time this report was prepared. These preliminary data provide an initial unstandardized point of comparison for military responses. On two of the three questions, military personnel displayed a higher level of knowledge than the civilian population. Over 90% of military personnel correctly responded that a person with the AIDS virus can look and feel healthy, compared to 80% of civilians for the 1991 NHIS. For the question comparing the effectiveness of natural membrane and latex condoms, 42.5% of military personnel provided the correct response. For the total civilian population, only 19% responded correctly. Among civilians, the younger population was better informed on this issue; but even with 18- to 29-year-olds, only 28% provided the correct response. The benefits of the military's educational efforts at informing personnel on effective condom use are evident from the increased knowledge compared to civilians. However, even though military personnel did better than civilians on this item, over half did not know the correct answer, indicating the need for ongoing educational programs.

Seven of the items related to beliefs about transmission of HIV on the 1992 Worldwide Survey were also on the 1990 NHIS (see Table 11.5). Again, although for a number of the items the differences between the two populations were statistically significant, there were no clear and striking patterns of differences between the civilian and military populations on items related to casual transmission. More civilians (30.7%) than military personnel (27.8%) incorrectly believed a person could contract HIV through insects. Other items on the risks of casual contact were similar for the two groups. Although the vast majority of both groups saw sharing needles as a method of transmission, slightly more civilians (98.5%) than military personnel (93.9%) believed this was a method of becoming infected. The question on risks related to being cared for by an infected health care worker was not on the 1990 NHIS so standardized comparisons were not possible. However, preliminary results from the 1991 NHIS (Hardy, 1992) suggest that military and civilian responses to this item were quite similar.

11.6 Summary

Most military personnel knew how HIV infection spreads. There was a high degree of awareness that AIDS transmission is strongly associated with sexual behavior. Nonetheless, there was a fairly high level of misinformation about some means of HIV transmission that might interfere with day-to-day activities of military life.

Table 11.5 Beliefs About How AIDS Is Transmitted, Military Personnel and Civilians: Standardized Comparisons

Pay Grade/Item	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Working with someone with AIDS virus	7.9 (0.3)	9.7 (0.4)[a]	10.0 (0.6)[a]	10.9 (1.1)[a]	9.8 (1.2)	8.1 (0.4)
Eating in dining facility where cook has AIDS virus	22.4 (0.4)	25.7 (0.8)[a]	24.9 (1.0)[a]	26.0 (2.1)	31.1 (2.2)[a]	24.3 (1.3)
Sharing eating utensils with someone with AIDS virus	29.3 (0.5)	25.7 (0.5)[a]	24.2 (0.8)[a]	24.9 (1.1)[a]	28.9 (1.8)	26.9 (0.7)[a]
Using public toilets	16.9 (0.4)	11.8 (0.5)[a]	12.7 (0.9)[a]	9.7 (0.7)[a]	15.9 (2.1)	11.6 (0.8)[a]
Sharing needles with someone with AIDS virus	98.5 (0.1)	93.9 (0.6)[a]	93.2 (0.7)[a]	92.7 (1.8)[a]	93.9 (0.6)[a]	96.0 (0.4)[a]
Coughing or sneezing	24.1 (0.5)	23.1 (0.6)	22.6 (0.7)	21.9 (0.8)[a]	24.0 (3.0)	24.5 (1.0)
Mosquitoes or other insects	30.7 (0.6)	27.8 (0.9)[a]	27.8 (1.4)	28.7 (2.2)	30.3 (0.9)	26.0 (1.2)[a]
Being cared for by health care worker with AIDS virus	--[b] --[b]	57.5 (0.6)	58.7 (1.3)	55.8 (0.9)	60.0 (2.5)	57.2 (1.1)
Getting blood transfusion	--[b] --[b]	68.7 (0.9)	70.4 (1.3)	70.0 (2.2)	70.7 (1.4)	64.9 (1.6)

Note: Table values are percentages (with standard errors in parentheses). Data are estimates of individuals who believe that AIDS transmission is "very likely" or "somewhat likely" in the ways mentioned. Civilian data have been standardized to military data by age, race/ethnicity, and education. Data for the individual Services are total population estimates.

[a]Significantly different from civilian at the .05 level.
[b]Item not in the 1990 National Health Interview Survey.

Civilian data source: National Health Interview Survey, 1990.
Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

11.6.1 Knowledge About HIV Transmission

Overall, military personnel were highly aware of how HIV is transmitted and could distinguish between HIV infection and AIDS. However, they were less informed about the medical details of AIDS (see Table 11.1).

- Although the vast majority of military personnel knew sexual contact was a means of HIV transmission, 5% still lacked this knowledge.
- Most military personnel knew the difference between HIV infection and AIDS (88.4%) and knew that an infected person could still look and feel healthy (92.3%).
- Less than half (42.5%) knew that there was a difference in effectiveness between natural-membrane and latex condoms in preventing transmission of HIV.

11.6.2 Beliefs About AIDS Transmission

The extent and accuracy of military personnel's knowledge about HIV infection and AIDS is reflected in their level of awareness about AIDS transmission and their beliefs about the likelihood of HIV transmission through various avenues (see Table 11.3).

- Virtually all military personnel knew that HIV can be transmitted by needle-sharing (93.9%).
- Over half (57.5%) of military personnel incorrectly believed that being cared for by an infected health care worker is likely to result in transmission of the virus.
- Sizable percentages incorrectly believed that HIV can be transmitted by nonpersonal contact such as sharing eating utensils with an infected person (25.7%) or eating in a dining facility where the cook is infected (25.7%).
- In general, personnel among all four Services were equally informed about HIV transmission.
- Personnel who said they use latex condoms regularly were more likely to correctly state that these condoms were more effective than natural-membrane condoms (50.7%) than were those who used natural-membrane condoms (29.7%) or no condom (41.1%) (See Table 11.2.)

11.6.3 Military and Civilian Comparisons

We standardized civilian data from the 1990 National Health Interview Survey (NHIS) to the military population worldwide by age, race/ethnicity, and education,

and then compared knowledge and beliefs of military personnel and civilians about HIV and AIDS. Knowledge and beliefs of military personnel about HIV transmission were quite similar to those of their civilian counterparts. Though most differences between civilians and military personnel were statistically significant, the actual magnitude of differences between the two groups was typically quite small (see Tables 11.4 and 11.5).

- Military and civilian responses differed by five or more percentage points on only two items: whether HIV can damage the brain and whether drugs are available to extend the life of an HIV-infected person. In both cases, civilians were more likely to provide the correct response. However, neither item is critical to prevention efforts.

- Using preliminary civilian data from the 1991 NHIS (Hardy, 1992), we found that over 90% of military personnel knew that a person could look and feel healthy and still be infected, compared to 80% of civilians (item not included in the NHIS prior to 1991).

- Two out of five military personnel (42.5%) knew that latex condoms are superior to natural-membrane ones in preventing transmission of HIV. Based on preliminary civilian data, this level of knowledge is much higher than among their civilian counterparts (28% of civilians ages 18-29; Hardy, 1992).

Despite substantial knowledge about the means of transmission and prevention of HIV infection and AIDS, many military personnel are not well informed. One area of specific concern is the lack of differentiation between natural-membrane and latex condoms in preventing transmission of HIV. Another gap in knowledge concerns misconceptions about HIV transmission through casual contact. These findings indicate the need to continue and to intensify military educational efforts about AIDS.

12. SPECIAL ISSUES

In this chapter, we address special issues that were included for the first time in 1992 as part of the Worldwide Survey but are nevertheless of potential importance to policymakers in the military. Specifically, in this chapter, we present findings on the involvement of military personnel in Operation Desert Shield/Desert Storm and effects that this involvement had on substance use, both during and after the Persian Gulf War. This chapter also examines findings on the prevalence of problem or pathological gambling in the military.

12.1 Operations Desert Shield and Desert Storm

12.1.1 Background

In late 1990 and early 1991, approximately one-half million military personnel and reservists participated in Operations Desert Shield and/or Desert Storm in the Middle East. Although the long-term medical, psychological, and social effects of participation in the Persian Gulf War are not known to date, the mental health of participants appears not to have suffered. Only 6.5% of the medical evacuations from the region were for psychiatric problems (Labbate & Snow, 1992); alcohol-related problems also appear to have been extremely limited. There are several proposed reasons for the relative lack of adverse effects due to participation in the Operation, including the volunteer status of the force, the overall decline in alcohol and drug use among military personnel, and the cultural environment of the Middle East (Gunby, 1991a). The lack of alcohol and drug problems among personnel serving in the Middle East has been related to the strict prohibition of alcohol and other drugs in Saudi Arabia (Gunby, 1991b).

However, no such prohibition existed against the use of tobacco products. As indicated in Chapter 6, the perceived level of work-related stress was a significant predictor of cigarette smoking (Table 6.10), and among personnel who smoked, stress reduction was a common motivation for smoking (Table 6.8). Thus, for military personnel who served in the Gulf, tobacco use could potentially have increased in response to stressors associated with the Operation, particularly since alcohol use was prohibited.

The following common stressors were reported by a group of 158 Army personnel in Saudi Arabia who were treated briefly for stress reactions: fatigue, cold, sleep deprivation, poor unit morale, and perceived threats to personal safety (McDuff & Johnson, 1992). In addition to stressors such as fear of being attacked and long duty hours with limited rest, a small (N=22) group of Army soldiers treated in a stress recovery unit for symptoms of combat fatigue reported other stressors, such as not knowing their length of stay in Saudi Arabia, lack of privacy, and feelings of having little or no control over their lives (Johnson, Cline, Marcum, & Intress, 1992). Thus, personnel who served in the Gulf may have been

exposed to a variety of potential stressors in addition to direct combat, despite the brief period in which military personnel were engaged in direct hostilities.

Furthermore, although relatively few mental health problems have been reported to date, posttraumatic stress disorders may yet arise. Among Vietnam veterans, alcohol abuse and dependence symptoms commonly occurred among those diagnosed as having posttraumatic stress disorder (Kulka et al., 1990). Thus, personnel returning from the Gulf into an environment where alcohol use was again permitted could have begun to use alcohol to cope with stress reactions associated with the Operation. A study by Labbate and Snow (1992) of members of an Army mechanized unit that had been deployed in the Gulf indicated that soldiers often used alcohol to alleviate nightmares and other sleep disturbances, and over a third of the respondents reported an increase in alcohol use once they were no longer in the Gulf. Although the authors noted some important limitations of their study, such as the small sample size (N=56), and the lack of full diagnostic interviews, their results suggest the need for further examination of issues surrounding substance use among military personnel who served in Desert Shield/Desert Storm, and particularly Gulf War veterans' patterns of substance use upon returning from the region.

Although the 1992 Worldwide Survey was not designed to provide a full evaluation of the impact of Operations Desert Shield and Desert Storm, the survey instrument did include a small set of items on substance use during and following service in the Operation. In addition, 1992 Worldwide Survey findings on substance use and service in Desert Shield/Desert Storm are based on data from a large, probability-based survey of active duty personnel in all four Services, rather than small convenience samples of personnel in single units within a single Service. Thus, data from the 1992 Worldwide Survey can provide an important addition to the body of knowledge concerning the impacts of Desert Shield and Desert Storm on military personnel who served in the Operation.

12.1.2 Demographic Characteristics of Personnel Who Served

Based on 1992 Worldwide Survey data, an estimated 22.8% of active duty personnel in the total DoD served in the Gulf region. As might be expected, higher percentages of Army (30.7%) and Marine Corps (43.0%) personnel than Navy (14.2%) or Air Force (15.5%) personnel served in the Operation (Table 12.1). The majority served 6 months or less. Marines were most likely to serve longer than 6 months.

Demographic characteristics of personnel who served or did not serve in Operation Desert Shield/Desert Storm are shown in Table 12.2 for the total DoD and in Tables D.25 through D.28 in Appendix D for each of the Services. Estimates for educational level, age, pay grade, and region reflect characteristics of personnel at the time the Worldwide Survey was conducted in 1992. Thus, estimates for these four characteristics may not

Table 12.1 Service in Operation Desert Shield/Desert Storm

Length of Service	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Did not serve	69.3	(4.5)	85.8	(3.5)	57.1	(5.2)	84.5	(4.0)	77.3	(2.3)
1 month or less	1.1	(0.3)	1.3	(0.2)	0.6	(0.1)	1.4	(0.4)	1.2	(0.2)
2-3 months	4.3	(0.8)	3.1	(0.7)	3.7	(1.1)	4.9	(1.3)	4.1	(0.5)
4-6 months	15.7	(3.5)	6.1	(2.1)	17.5	(3.7)	4.6	(0.9)	9.9	(1.4)
More than 6 months	9.6	(2.6)	3.7	(1.0)	21.2	(3.3)	4.6	(1.8)	7.6	(1.1)

Note: Table values are percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

necessarily reflect the characteristics of personnel during the period of time pertaining to Operation Desert Shield/Desert Storm.

We found the same basic patterns within each of the Services that we observed for the total DoD. As might be expected, a higher proportion of Desert Storm veterans in the total DoD were male (92.5%), compared to the proportion of males among personnel who did not serve in the Middle East (82.6%). Personnel who served in Operation Desert Shield/Desert Storm also tended to have a lower level of education than did personnel who did not serve in the region; only 13.8% of personnel who served in Operation Desert Shield/Desert Storm had a college degree, compared with 20.9% of personnel who did not serve in the Operation. Although there were similar proportions of personnel in the E1-E3 pay grade group among personnel who served or did not serve in the Operation (16.1% vs. 18.6%), a higher proportion of personnel who served were in the E4-E6 pay grade group (62.1%), compared to personnel who did not serve in the region (53.7%). As indicated above, however, it is not possible to determine from 1992 Worldwide Survey data the proportion of personnel in the E4-E6 pay grade group who may have been in the E1-E3 group during the period of Operation Desert Shield/Desert Storm.

12.1.3 Substance Use During Service in Desert Shield/Desert Storm

Findings on reported substance use during service in the Operation are shown in Table 12.3. We present data only for those personnel who actually served in the region. As might be expected, large proportions (between 35 and 56%) of personnel in the total DoD and in all four Services reported that their alcohol use decreased during the time that they served in the Middle East. These decreases in alcohol use probably reflect the cultural prohibitions in the region against alcohol use. However, between 6 and 27% of personnel did not change their alcohol use patterns while serving in the region, and alcohol use reportedly increased among 4 to 12% of personnel. This latter finding in particular suggests that despite the cultural prohibitions against alcohol use, a number of

Table 12.2 Demographic Characteristics of Personnel Who Served or Did Not Serve in Operation Desert Shield/Desert Storm, Total DoD

Characteristic	Status					
	Served in Desert Storm (N=3,438)		Did Not Serve in Desert Storm (N=12,910)		Total DoD[a] (N=16,395)	
Sex						
Male	92.5	(1.0)	82.6	(1.8)	85.0	(1.5)
Female	7.5	(1.0)	17.4	(1.8)	15.0	(1.5)
Race/Ethnicity						
White, non-Hispanic	64.2	(1.6)	67.7	(1.1)	66.9	(1.0)
Black, non-Hispanic	20.6	(1.4)	19.8	(1.1)	19.9	(0.9)
Hispanic	10.3	(1.1)	7.3	(0.5)	8.0	(0.5)
Other	4.8	(0.6)	5.3	(0.5)	5.2	(0.4)
Education[b]						
Less than high school graduate	0.6	(0.2)	0.5	(0.1)	0.5	(0.1)
High school graduate or GED	46.0	(2.0)	36.1	(2.4)	38.5	(2.0)
Some college	39.6	(1.6)	42.6	(1.4)	41.9	(1.2)
College graduate or higher	13.8	(1.5)	20.9	(2.1)	19.1	(1.8)
Age[b]						
20 and under	8.0	(1.0)	10.6	(1.0)	9.9	(0.9)
21-25	34.2	(2.0)	27.6	(1.7)	29.2	(1.4)
26-34	37.5	(1.9)	37.1	(1.0)	37.2	(0.9)
35 and older	20.3	(1.5)	24.7	(1.9)	23.6	(1.6)
Pay Grade[b]						
E1-E3	16.1	(2.2)	18.6	(1.8)	18.1	(1.7)
E4-E6	62.1	(1.8)	53.7	(2.1)	55.7	(1.8)
E7-E9	8.7	(0.5)	10.9	(0.7)	10.4	(0.6)
W1-W4	1.7	(0.4)	0.9	(0.1)	1.0	(0.1)
O1-O3	7.4	(0.6)	9.4	(1.0)	8.9	(0.8)
O4-O10	4.0	(1.0)	6.6	(1.4)	5.9	(1.2)
Region[b]						
Americas	81.5	(2.8)	77.8	(2.3)	78.7	(2.1)
North Pacific	3.3	(1.1)	6.1	(1.6)	5.5	(1.4)
Other Pacific	2.3	(0.8)	4.8	(0.5)	4.2	(0.4)
Europe	13.0	(2.4)	11.3	(1.6)	11.7	(1.6)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents.

[a]Includes 47 respondents who did not indicate whether they served or did not serve in Operation Desert Shield/Desert Storm.

[b]At the time the Worldwide Survey was administered in 1992.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 12.3 Substance Use During Service in Operation Desert Shield/ Desert Storm

Substance Use*	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Alcohol									N = 3,348	
Nondrinker (before and during)	45.3	(2.8)	25.7	(5.4)	29.3	(1.4)	29.0	(1.8)	35.2	(2.0)
Drinking decreased	44.5	(2.8)	35.4	(2.4)	56.3	(3.5)	44.8	(5.0)	45.2	(1.8)
Drinking stayed the same	6.1	(0.7)	27.2	(3.6)	6.5	(1.5)	14.1	(1.9)	11.8	(1.3)
Drinking increased	4.1	(0.6)	11.7	(2.3)	7.9	(2.0)	12.0	(4.0)	7.9	(1.0)
Drugs									N = 3,438	
Not a drug user (before and during)	95.3	(1.3)	+	(+)	93.2	(2.5)	99.8	(0.2)	95.6	(1.2)
Drug use decreased	3.2	(0.8)	2.9	(2.0)	3.4	(1.4)	**	(**)	2.5	(0.6)
Drug use stayed the same	0.6	(0.3)	0.2	(0.1)	2.2	(1.6)	**	(**)	0.7	(0.4)
Drug use increased	0.9	(0.5)	2.4	(2.1)	1.2	(1.2)	0.2	(0.2)	1.1	(0.6)
Cigarettes									N = 3,419	
Nonsmoker (before and during)	58.4	(3.4)	57.0	(3.3)	52.6	(5.9)	63.0	(1.8)	57.9	(2.0)
Smoking decreased	4.5	(0.5)	6.2	(2.1)	4.2	(1.9)	2.7	(0.9)	4.4	(0.6)
Smoking stayed the same	12.2	(0.8)	20.1	(2.2)	16.5	(2.4)	12.8	(2.0)	14.7	(0.8)
Smoking increased	16.8	(2.1)	10.8	(1.4)	17.4	(2.5)	15.0	(1.5)	15.4	(1.1)
Resumed smoking	4.8	(0.9)	4.5	(2.0)	3.3	(0.5)	5.8	(0.8)	4.6	(0.6)
Started smoking for first time	3.3	(0.9)	1.4	(0.7)	6.1	(1.8)	0.8	(0.6)	3.0	(0.6)

Note: Table values are percentages (with standard errors in parentheses). N's are unweighted counts of respondents who served in Operation Desert Shield/Desert Storm, and who responded to these questions. Estimates have not been adjusted for sociodemographic differences among Services.

*Data are based on respondents who served in Operation Desert Shield/Desert Storm and are for the period during which they served in Operation Desert Shield/Desert Storm.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

personnel serving in the region somehow were still able to obtain alcoholic beverages and to continue drinking. The highest rates of drinking were among Navy and Air Force personnel, those more likely to be stationed away from the front lines and perhaps able to obtain access to alcohol more readily.

As stated previously, there were no cultural prohibitions against cigarette use by personnel stationed in the Gulf region, and the findings on cigarette use while personnel were serving in the region reflect this. Approximately 4% of the personnel who served in Desert Shield/Desert Storm decreased their smoking during the period of their service in the Operation. Overall, for total DoD, 14.7% of the personnel who served in the Operation continued to smoke at the same level they smoked prior to the war and nearly one out of four (23.0%) either increased their smoking (15.4%), resumed smoking after having quit (4.6%), or started smoking for the first time (3.0%). The percentages of personnel in the Army, Navy, and Marine Corps who increased their smoking while serving in Desert Shield/Desert Storm, resumed smoking, or started smoking for the first time were all around 25 to 27%; the percentage in the Air Force was slightly lower (21.6%). However, a much higher proportion of Marine Corps personnel served in the Operation (43%), compared to the percentages in the other Services. Therefore, approximately 11.5% of <u>all</u> Marine Corps personnel (and not just those who served in the Middle East) increased, resumed, or started smoking during Desert Shield/Desert Storm.

The relatively low prevalence of drug use in the military is reflected in the data on drug use while personnel were serving in Operation Desert Shield/Desert Storm. Less than 5% of all military personnel who served in the Gulf reported any drug use before or during service in Desert Shield/Desert Storm. With the exception of the Air Force, drug use either stayed the same or increased for 1.5 to 3.4% of personnel in the total DoD and the other three Services who served in the Operation.

Some caution should be used when interpreting these data, particularly the data on the nonuse of different substances before or during service in Desert Shield/Desert Storm. These rates may vary from earlier reported rates, in part because respondents were classifying themselves as substance users (or nonusers). For example, 20.4% of all military personnel were classified previously as abstainers (Table 3.1), but over 35% of personnel in the total DoD who served in Desert Shield/Desert Storm classified themselves as "nondrinkers" before or during their period of service. Interestingly, the combined prevalence of abstainers and infrequent/light drinkers from Table 3.1 for the total DoD is 39.2%, a figure that is much closer to the 35% of nondrinkers among personnel who served in the Middle East. Similarly, the combined prevalence rates of abstainers and infrequent/light drinkers for the Army and Marine Corps (Tables D.1 and D.3), the two Services with the greatest proportion of personnel having been deployed to the region, are similar to the proportions of nondrinkers shown for these Services in Table 12.3. It is possible that infrequent/light drinkers who served in Desert Shield/Desert

Storm may have considered themselves nondrinkers prior to and during service in the region. This seems particularly likely if their drinking was very infrequent. In addition, respondents may have used different time frames prior to service in the Middle East in deciding whether to classify themselves as a nondrinker before being deployed. However, regardless of when these personnel last had a drink prior to being deployed to the Middle East, the data from Table 12.1 strongly suggest those who classified themselves as nondrinkers adhered to the cultural abstinence norm and did not drink while they were serving in the region.

Similarly, for drug use, a higher proportion of personnel who served in the Middle East classified themselves as nonusers before and during service in the region than might otherwise have been expected based on prevalence data on drug use for the past 12 months (Table 5.2). Depending on when personnel who served in Desert Shield/Desert Storm last used drugs, if at all, they may have considered themselves essentially not to have used drugs prior to service in the Middle East. In particular, nearly 11% of all Marine Corps personnel had some nonmedical use of drugs in the 12 months prior to the survey (Table 5.2), but less than 7% of the Marine Corps personnel who served in the Middle East admitted to any drug use prior to or during the Operation. However, the predominant pattern of drug use among enlisted personnel, the group most likely to use drugs, was for them to use drugs infrequently (Table 5.4).

We investigated this issue further by examining unweighted frequencies of the last occurrence of reported drug use among survey respondents who served in Desert Shield/Desert Storm. About 95% of the respondents in the total DoD who served in the region reported that they did not use drugs before or during service there, and that they had never used drugs in their lifetimes, or else they did not use drugs before or during service and had last used any drugs over a year prior to their participation in the Worldwide Survey. Almost all of the respondents who served in Desert Shield/Desert Storm and who last used drugs over a year prior to the survey were considering themselves not to have used drugs prior to or during their service in the Operation.

Despite these caveats and limitations in the data, findings from the 1992 Worldwide Survey do suggest that service in Desert Shield/Desert Storm had a positive impact on alcohol use (i.e., increased abstinence) while personnel were serving in the Operation, but that for a sizable proportion of personnel, participation in the Operation had an adverse effect with regard to smoking during the period they were deployed. A more important issue, however, is the pattern of substance use among this group of personnel now that they are no longer serving in the Middle East, as an indication of possible longer-term effects that service in Desert Shield/Desert Storm had on military personnel.

12.1.4 Substance Use After Service in Desert Shield/Desert Storm

In this section, we examine self-reported changes in individuals' substance use patterns now that they are no longer deployed in the Middle East. We also present comparisons between personnel who served or did not serve in Operation Desert Shield/Desert Storm, in terms of their patterns of current alcohol use, drug use, and smoking. Through these comparisons, we assess whether substance use patterns differed between personnel who served or did not serve in the Middle East, once the former were redeployed out of the region; or whether the substance use patterns of personnel who formerly served in the Middle East resembled--in 1992--those of personnel who never served in Operation Desert Shield/Desert Storm. In particular, once veterans of Desert Shield/Desert Storm were no longer in an environment in which alcohol use was prohibited, did they return to a pattern of drinking that was similar to that of personnel who never served in the Operation? Once veterans of the Operation were no longer faced with the same kinds of stressors that they may have experienced while in the Middle East, did their smoking patterns begin to resemble those of nonveterans of the Operation?

We asked 1992 Worldwide Survey respondents who served in Operation Desert Shield/Desert Storm to compare their alcohol, other drug, and cigarette use levels with the corresponding levels before they served in the Middle East. Findings are presented in Table 12.4 for alcohol use and cigarette smoking, the two substances most affected by the Operation. Of personnel in the total DoD and in each of the Services who served in the Operation, and who identified themselves as being alcohol users, approximately two-thirds indicated that they had returned to the same level of drinking or were drinking more, compared to their drinking levels prior to service in the war; over half indicated that they had returned to drinking at the same level; and 13.4% were drinking more.

Of Desert Shield/Desert Storm veterans who indicated that they were cigarette smokers prior to serving in the Operation, nearly one in five (19.0%) indicated that they had since quit smoking, and another 25.1% indicated that they were now smoking less. In comparison, 13.0% of all personnel in the total DoD who were smokers in the past year successfully quit smoking (Table 6.11). As was the case with alcohol consumption, however, over half (55.9%) of Desert Shield/Desert Storm veterans who were smokers prior to the Operation were presently smoking at the same level as they were prior to Desert Shield/Desert Storm, or else they were smoking more.

These findings might suggest that service in Desert Shield/Desert Storm may have had a longer-term impact on reducing alcohol use among a third of military personnel who were alcohol users but only a limited impact on a majority of alcohol users. However, we did not ask respondents about their specific quantity and frequency of alcohol consumption for any period of time prior to their service in Desert Shield/Desert Storm. Therefore, it is not possible to determine from 1992 Worldwide Survey data whether

Table 12.4 Alcohol and Cigarette Use Before and After Service in Operation Desert Shield/Desert Storm

Substance Use*	N	Army	Navy	Marine Corps	Air Force	Total DoD
Alcohol						
All personnel	3,368					
Nondrinker		22.2 (1.7)	18.6 (4.0)	13.3 (1.4)	15.8 (1.7)	18.5 (1.1)
Drink less now		24.6 (1.7)	27.0 (2.5)	32.4 (3.9)	29.0 (2.1)	27.5 (1.3)
Drink about the same		40.1 (2.2)	45.2 (5.0)	41.1 (3.5)	48.4 (1.4)	42.9 (1.6)
Drink more now		13.1 (2.0)	9.2 (1.4)	13.3 (1.1)	6.8 (1.2)	11.2 (1.0)
Alcohol users only	2,686					
Drink less now		31.6 (1.8)	33.1 (4.3)	37.3 (4.6)	34.4 (2.1)	33.6 (1.6)
Drink about the same		51.5 (3.3)	55.6 (3.8)	47.3 (3.8)	57.5 (2.1)	52.6 (1.9)
Drink more now		16.9 (2.4)	11.3 (1.3)	15.3 (1.1)	8.1 (1.3)	13.4 (1.1)
Cigarettes						
All personnel	3,394					
Nonsmoker		55.4 (3.0)	53.5 (2.5)	49.8 (5.4)	60.3 (1.4)	54.9 (1.8)
Quit smoking		8.3 (0.8)	10.2 (1.7)	7.7 (1.4)	8.2 (1.3)	8.6 (0.6)
Smoke less now		9.9 (0.8)	12.1 (1.5)	14.2 (2.0)	10.6 (3.4)	11.3 (0.9)
Smoke about the same		20.0 (1.7)	21.7 (1.8)	21.1 (2.1)	17.8 (3.4)	20.1 (1.1)
Smoke more now		6.3 (0.9)	2.4 (0.8)	7.1 (1.4)	3.0 (0.6)	5.1 (0.6)
Smokers only	1,422					
Quit smoking		18.7 (1.7)	22.0 (3.0)	15.4 (1.9)	20.8 (3.2)	19.0 (1.2)
Smoke less now		22.2 (1.4)	26.1 (3.2)	28.3 (2.0)	+ (+)	25.1 (1.8)
Smoke about the same		44.9 (1.9)	45.7 (2.7)	42.0 (1.9)	+ (+)	44.6 (1.8)
Smoke more now		14.2 (1.6)	5.2 (1.9)	14.2 (2.5)	7.6 (1.5)	11.3 (1.1)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents who served in Operation Desert Shield/Desert Storm. Estimates have not been adjusted for sociodemographic differences among Services.

*Respondents were asked to compare their alcohol use and smoking levels before they served in Operation Desert Shield/Desert Storm with their current levels.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Desert Shield/Desert Storm veterans who indicated that they were drinking "more" relative to their drinking before they served in the Middle East actually moved from a lower drinking level category to a higher one (e.g., from moderate to moderate/heavy), nor is it possible to determine the number of Desert Shield/Desert Storm veterans who moved from a non-heavy drinking level to being heavy drinkers following their service in the Middle East. Similarly, it is not possible to determine from these data whether Desert Shield/Desert Storm veterans who indicated that they were drinking "less" actually moved to a lower drinking level category, especially for those veterans who were heavy drinkers prior to service in the region. Similar cautions apply to the data on smoking levels before and after service in Desert Shield/Desert Storm, except for the percentage of Desert Shield/Desert Storm veterans who quit smoking; in this case, personnel moved from being smokers to being nonsmokers.

Comparisons of drinking levels, drug use patterns, and smoking patterns between personnel who served or did not serve in Desert Shield/Desert Storm are shown in Tables 12.5 through 12.7. A chi-square test to compare the drinking levels for personnel who served in Desert Shield/Desert Storm versus those who did not indicated that the distributions for the two groups were significantly different ($p<.05$) for the total DoD, the Marine Corps, and the Air Force. There were no significant differences in the drinking level distributions for the Army and the Navy, between personnel who served in Desert Shield/Desert Storm and those who did not.

For the total DoD and the Air Force, t test results indicated that there was a significantly higher ($p<.05$) percentage of abstainers in 1992 among personnel who had not served in Desert Shield/Desert Storm. In addition, the prevalence of heavy alcohol use in 1992 among veterans of Desert Shield/Desert Storm was significantly greater than the prevalence of heavy alcohol use among nonveterans of the Operation for the total DoD and the Marine Corps. Overall, these findings suggest that any short-term impact on alcohol use due to the forced abstinence from alcohol in the region had been erased.

It would also appear that there was a rebound in heavy alcohol use among total DoD and Marine Corps personnel who served in the Middle East. However, when we included service in Desert Shield/Desert Storm as a variable in logistic regression models for predicting heavy drinking--and after we had controlled for the effects of the other variables in the models (see Tables F.1 through F.3)--service in Desert Shield/Desert Storm was not a significant predictor of heavy alcohol use. This finding suggests that any apparent differences in heavy alcohol use rates between personnel who served in Desert Shield/Desert Storm and those who did not are probably due to demographic or other differences between the two groups, as described in Section 12.1.2.

Similarly, we observed some significant differences in prevalences of past-12-month drug use, any current cigarette smoking, and heavy smoking between personnel who

Table 12.5 Present Drinking Level and Service in Operation Desert Shield/Desert Storm

Status/Drinking Level	N	Service: Army	Navy	Marine Corps[a]	Air Force[a]	Total DoD[a]
Did Not Serve						
Abstainer	2793	22.3 (1.7)	20.4 (2.1)	15.3 (1.6)	22.4 (0.9)	21.1 (0.9)
Infrequent/light	2461	17.8 (0.6)	19.7 (1.4)	16.0 (0.8)	21.5 (0.9)	19.5 (0.6)
Moderate	2626	17.1 (1.2)	20.0 (1.5)	19.5 (2.5)	21.1 (0.8)	19.5 (0.7)
Moderate/heavy	3532	26.6 (1.8)	26.4 (0.6)	25.2 (3.0)	24.9 (1.0)	25.9 (0.7)
Heavy	1467	16.1 (1.7)	13.5 (1.0)	23.9 (1.1)	10.1 (0.9)	14.0 (0.7)
Served						
Abstainer	710	20.9 (1.8)	18.7 (3.1)	15.1 (0.9)	15.7 (1.8)[b]	18.3 (1.0)[b]
Infrequent/light	570	17.3 (1.2)	15.5 (1.7)	13.2 (2.4)	20.2 (2.8)	16.7 (0.9)[c]
Moderate	717	17.4 (1.1)	19.7 (3.9)	19.0 (1.8)	22.3 (2.9)	19.1 (1.1)
Moderate/heavy	948	25.1 (1.7)	30.1 (2.7)	24.9 (1.8)	28.2 (1.9)	26.6 (1.0)
Heavy	485	19.3 (1.9)	16.1 (5.5)	27.7 (1.8)[d]	13.6 (2.1)	19.2 (1.4)[d]

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages within each category (i.e., did not serve or served) who fall into each drinking level. N's are unweighted counts of respondents who did not serve or who served in Operation Desert Shield/Desert Storm. Statistical comparisons were made within Services only (and not between services) for personnel in a given drinking level category who did not serve or who served in Operation Desert Shield/Desert Storm (e.g., Army abstainers who did not serve were compared with Army abstainers who served). Only those differences that were statistically significant are indicated. Estimates have not been adjusted for sociodemographic differences among Services.

[a]A chi-square test to compare the drinking level distributions between personnel who served in Operation Desert Shield/Desert Storm and personnel who did not serve indicated that the distributions were significantly different between the two groups at the 95% confidence level.

[b]Significantly different at the 95% confidence level from the percentage of abstainers among personnel who did not serve in Operation Desert Shield/Desert Storm.

[c]Significantly different at the 95% confidence level from the percentage of infrequent/light drinkers among personnel who did not serve in Operation Desert Shield/Desert Storm.

[d]Significantly different at the 95% confidence level from the percentage of heavy drinkers among personnel who did not serve in Operation Desert Shield/Desert Storm.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 12.6 Service in Operation Desert Shield/Desert Storm and Drug Use, Past 30 Days and Past 12 Months

Status/Period of Use	N	Service				
		Army	Navy	Marine Corps	Air Force	Total DoD
Did Not Serve						
Past 30 days	12863	3.3 (0.5)	3.5 (0.7)	4.1 (0.8)	1.2 (0.2)	2.8 (0.3)
Past 12 months	12832	7.0 (0.7)	5.5 (1.1)	8.7 (1.3)	2.2 (0.2)	5.1 (0.4)
Served						
Past 30 days	3429	5.0 (2.5)	4.4 (1.8)	7.7 (2.3)	1.5 (0.5)	4.7 (1.2)
Past 12 months	3422	9.1 (2.3)	+ (+)	13.5 (3.3)	3.0 (0.8)	9.0 (1.7)*

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages within each category (i.e., did not serve, served) who fall into each category. N's are unweighted counts of respondents who did not serve or who served in Operation Desert Shield/Desert Storm. Statistical comparisons were made within Services only (and not between services) for past-30-day and past-12-month drug use among personnel who did not serve or who served in Operation Desert Shield/Desert Storm (e.g., past-30-day drug use of Army personnel who did not serve compared with that of Army personnel who served). Only those differences that were statistically significant are indicated. Estimates have not been adjusted for sociodemographic differences among Services.

*Significantly different at the 95% confidence level from the percentage of past-12-month drug users among personnel who did not serve in Operation Desert Shield/Desert Storm.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

served in Desert Shield/Desert Storm and those who did not (Tables 12.6 and 12.7). In particular, rates of past-12-month drug use and any smoking in the total DoD were significantly greater for personnel who served in Desert Shield/Desert Storm, compared to those who did not. As was the case for heavy alcohol use, however, when we included service in Desert Shield/Desert Storm in the logistic regression models for drug use and smoking, Desert Shield/Desert Storm had no significant effect on either drug use or smoking (see Tables F.4 through F.7). These findings suggest that apparent differences in drug use and smoking patterns between personnel who served or did not serve in Desert Shield/Desert Storm probably were due to demographic or other differences between the two groups.

To summarize, the majority of personnel who served in Desert Shield/Desert Storm who had used alcohol or who were smokers before serving in the Gulf indicated that they either returned to their current drinking and smoking levels upon returning from the Middle East, or else they were drinking or smoking more following their return. The former finding is not surprising, given that veterans of the Operation were back in an environment in which alcohol use was permitted. Although comparisons of (a) current alcohol use patterns, (b) past-30-day and past-12-month drug use patterns, and (c) current

Table 12.7 Service in Operation Desert Shield/Desert Storm and Cigarette Use, Past 30 Days

Status/Smoking Measure	N	Service				
		Army	Navy	Marine Corps	Air Force	Total DoD
Did Not Serve						
Any smoking	12857	38.0 (2.3)	37.8 (1.9)	36.8 (1.6)	28.6 (1.6)	34.9 (1.1)
Heavy smoking	12831	18.4 (1.2)	19.8 (0.7)	18.7 (1.8)	14.1 (1.1)	17.5 (0.6)
Served						
Any smoking	3425	37.9 (3.0)	38.3 (1.5)	45.3 (3.8)[a]	34.6 (1.5)[a]	38.7 (1.5)[a]
Heavy smoking	3415	17.4 (2.2)	23.4 (1.8)	23.8 (2.4)	16.9 (1.8)[b]	19.7 (1.1)

Note: Table entries are percentages (with standard errors in parentheses). Data are percentages within each category (i.e., did not serve, served) who fall into each category. N's are unweighted counts of respondents who did not serve or who served in Operation Desert Shield/Desert Storm. Statistical comparisons were made within Services only (and not between Services) for any smoking and heavy smoking among personnel who did not serve or who served in Operation Desert Shield/Desert Storm (e.g., any smoking among Army personnel who did not serve compared with that among Army personnel who served). Only those differences that were statistically significant are indicated. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Significantly different at the 95% confidence level from the percentage of current smokers among personnel who did not serve in Operation Desert Shield/Desert Storm.

[b]Significantly different at the 95% confidence level from the percentage of heavy smokers who did not serve in Operation Desert Shield/Desert Storm.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.smoking patterns between personnel who served or did not serve in

Desert Shield/Desert Storm suggested that there were some significant differences in substance use patterns between the two groups, these differences appear to have been due to factors other than service in Desert Shield/Desert Storm.

As stated previously, however, there are some important limitations to these data that affect the kinds of conclusions that analysts can draw. Specifically, we do not have detailed data on Desert Shield/Desert Storm veterans' substance use patterns prior to their service in the Middle East that are equivalent to the data that we have on past-30-day use of alcohol, past-30-day and past-12-month drug use, and past-30-day cigarette smoking. Furthermore, the 1992 Worldwide Survey questions on substance use and service in Desert Shield/Desert Storm were not designed to assess substance use in response to posttraumatic stress disorders. Further study will be needed to determine whether Desert Shield/Desert Storm veterans have tended to use alcohol and drugs to try to alleviate stress reactions associated with their service in the Middle East.

12.2 Gambling in the Military

12.2.1 Background and Significance

In recent years, there has been increasing interest and concern about pathological gambling in the military. Problems related to excessive gambling can affect the financial and psychological well-being of military personnel, and thus, in turn, can have a negative effect on military readiness.

There are currently many conceptualizations of the nature of pathological gambling behavior and its appropriate treatment, with excessive gambling often being regarded as an addiction similar to drug dependence and alcoholism, but without the use of a psychoactive substance. Gamblers Anonymous (GA), for example, is a 12-step self-help program for pathological gamblers that has been patterned after Alcoholics Anonymous (AA). The Brecksville Treatment program at the Cleveland Veterans Administration (VA) Hospital, the first inpatient treatment program for pathological gamblers, is a 30-day structured program whose treatment goals closely parallel those of many drug and alcohol treatment programs: complete abstinence from gambling, reduction of the urge to gamble, development of constructive substitutes for gambling, and restoration of social functioning (Custer, 1982; Russo, Taber, McCormick, & Ramirez, 1984).

Pathological gambling appears as a diagnostic category in the American Psychiatric Association's (APA's) Diagnostic and statistical manual of mental disorders, third edition, revised (DSM-III-R) (1987). At least four of the following diagnostic criteria must be met to identify the pathological gambler:

1. frequent preoccupation with gambling or obtaining money to gamble;
2. frequent gambling of large amounts or over a longer period than the individual intended;
3. a need to increase the size or frequency of bets to achieve the desired level of excitement;
4. restlessness or irritability if unable to gamble;
5. repeated loss of money by gambling, followed by returning another day to try to win back losses ("chasing");
6. repeated efforts to reduce or stop gambling;
7. frequent gambling at times when expected to fulfill social or occupational obligations;
8. sacrifice of some important social, occupational, or recreational activities in order to gamble; and

9. continuation of gambling despite an inability to pay mounting debts, or despite other significant social, occupational, or legal problems that the person knows to be exacerbated by gambling.

There have been only a limited number of studies of the prevalence of pathological gambling in the general population. A national study conducted in 1975 by the Institute for Social Research at the University of Michigan for the Commission on the Review of National Policy Toward Gambling found that 61% of adults had placed some kind of money bet in 1974, and 48% had placed a bet with someone other than a friend (Kallick, Suits, Dielman, & Hybels, 1979). The survey estimated the prevalence of compulsive gambling at approximately 0.7% overall, with a higher rate among males (1.1%) than among females (0.5%). State-level surveys in Ohio, the Delaware Valley (parts of New Jersey and Pennsylvania), and New York State in 1984 and 1985 found that the rates of pathological gambling ranged between 1.4% and 3.4% of the population (Lesieur, 1989).

The survey in New York State was a telephone survey using the South Oaks Gambling Screen (SOGS) of Lesieur and Blume (1987), a 20-item instrument designed to measure pathological gambling. Volberg & Steadman (1988) found that 2.8% of the New York sample scored 3 or 4 points on the SOGS, indicating "problem gambling." Another 1.4% scored 5 or more points on the SOGS and were classified as "probable pathological gamblers." Thus, 4.2% of the New York State population in the late 1980s could be classified as either problem or pathological gamblers. Volberg & Steadman also found that males were more likely than females to be problem or pathological gamblers, as were respondents under the age of 30, compared with those over 30; nonwhites compared with whites; persons without a high school education, compared with persons with a high school education or greater; and persons with lower incomes compared with persons with higher incomes.

In comparable surveys in New Jersey and Maryland using the SOGS, Volberg and Steadman (1989a) found that 2.8% of the New Jersey sample and 2.4% of the Maryland sample could be classified as problem gamblers, and 1.4% of the New Jersey sample and 1.5% of the Maryland sample could be classified as probable pathological gamblers. Thus, the prevalence rates for problem and pathological gambling in these two East Coast states were comparable to the rates that had been previously found in New York State. As was the case in New York State, disproportionate numbers of males, nonwhites, and individuals with less than a high school education were problem or probable pathological gamblers in the New Jersey and Maryland surveys; unlike the results from the New York State survey, age and income were not significantly related to problem and pathological gambling in either New Jersey or Maryland.

However, lifetime rates of problem and pathological gambling have been found to be lower in other parts of the United States. In surveys conducted in two midwestern

states, Iowa and South Dakota, the combined prevalences of problem and pathological gambling were 1.7% in Iowa and 2.8% in South Dakota, compared with combined prevalence rates of approximately 4% on the East Coast (Volberg & Steadman, 1989b; Volberg & Stuefen, 1991). However, it appears that the authors did not conduct analyses of demographic characteristics of problem and pathological gamblers within these two states, due to the greater homogeneity of their populations (i.e., predominantly white, higher income). Nevertheless, based on the demographic characteristics of problem and pathological gamblers that were observed in New York, New Jersey, and Maryland, the prevalence of problem or pathological gambling in the military could potentially be higher than the prevalence in the general population by virtue of the demographic composition of the military, with higher proportions of males, younger persons, and nonwhites in the military relative to the general population.

12.2.2 Prevalence of Problem Gambling

Respondents in the 1992 Worldwide Survey were asked a series of eight questions on problems related to gambling, in order to assess the lifetime prevalence of gambling problems and the lifetime prevalence of pathological gambling in the military. Items on gambling-related problems were patterned after the APA's diagnostic criteria. Specifically, respondents were asked whether they had ever had any of the following gambling-related problems:

- being increasingly preoccupied with gambling;
- needing to gamble with increased amounts of money to achieve the desired level of excitement;
- feeling restless or irritable when unable to gamble;
- gambling to escape from problems;
- going back to try to win back earlier gambling losses;
- lying to others about the extent of their gambling;
- having jeopardized or lost important relationships, a job, or career opportunities because of gambling; and
- borrowing money to relieve financial problems caused by gambling.

An affirmative answer to at least one of the above items was considered to be indicative of problem gambling at some point in a person's life, but not necessarily pathological gambling. Answering in the affirmative to three or more problem items was considered to indicate probable pathological gambling (H.R. Lesieur, personal communication, June 10, 1991).

Percentages of affirmative responses to each of the individual gambling items are shown in Table 12.8. Slightly more than 5% of all military personnel at some point in their lives had gone back and gambled in order to try to win back earlier gambling losses (i.e., they "chased" their money), with rates being slightly above 6% for the Navy and Marine Corps. In addition, approximately 4% of all military personnel experienced increased preoccupation with gambling at some point in their lives; we observed similar percentages for the Army, Navy, and Marine Corps. Over 2% of personnel in the total DoD and personnel in the Army, Navy, and Marine Corps also felt the need to gamble with increased amounts of money in order to achieve a desired level of excitement. Generally, less than 1% of personnel in the total DoD and in each Service had ever jeopardized or lost an important relationship or their job because of gambling, or had to borrow money to relieve a serious financial problem caused by gambling. Overall, the occurrence of specific gambling-related problems among Air Force personnel was generally less frequent than among the other three Services and in the total DoD.

Table 12.8 Prevalence of Gambling Problems (Lifetime)

Problem	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Increased preoccupation with gambling	3.9	(0.5)	5.2	(0.9)	4.7	(0.5)	2.8	(0.3)	4.1	(0.4)
Needed to gamble with increased amounts of money to achieve desired level of excitement	2.5	(0.4)	2.5	(0.2)	2.1	(0.5)	1.2	(0.2)	2.1	(0.2)
Restless or irritable when unable to gamble	1.3	(0.2)	1.7	(0.2)	2.0	(0.5)	1.0	(0.3)	1.4	(0.1)
Gambled to escape from problems	1.2	(0.2)	2.0	(0.7)	1.1	(0.3)	0.6	(0.1)	1.2	(0.2)
Went back to try to win back money lost	5.1	(0.6)	6.0	(0.5)	6.1	(0.8)	4.6	(0.6)	5.3	(0.3)
Lied to others about extent of gambling	1.0	(0.2)	1.4	(0.3)	1.4	(0.7)	0.7	(0.1)	1.1	(0.1)
Jeopardized or lost important relationships, job, or career opportunities because of gambling	0.3	(0.1)	0.6	(0.2)	0.2	(0.2)	0.3	(0.1)	0.4	(0.1)
Someone provided money to relieve financial problems caused by gambling	0.8	(0.2)	0.8	(0.2)	1.1	(0.3)	0.5	(0.1)	0.7	(0.1)

Note: Table values are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 12.9 and Figure 12.1 present information on the total number of gambling-related problems experienced by military personnel. For the total DoD, 7.1% of personnel had experienced at least one of the eight gambling-related problems in their lifetimes, and 2.0% experienced at least three of these gambling-related problems. The Army, Navy, and Marine Corps all had rates that were similar to those for the total DoD; the Air Force had slightly lower percentages of personnel having had one or more (or three or more) gambling-related problems. Thus, it would appear that the lifetime prevalence of pathological gambling among military personnel was at 2% of all personnel, or approximately 30,000 individuals for a military population of 1.5 million to 40,000 individuals for a military population of 2 million (i.e., the size of the military population is changing due to the drawdown). Another 5.1% of all military personnel, or approximately 78,000 to 104,000 individuals for a force of 1.5 million and 2 million, respectively, had some occurrence of gambling-related problems and should probably be considered to be at high risk for becoming pathological gamblers, if they continue to gamble. However, these estimates of the numbers of personnel affected are very approximate, as they will vary due to the size of the associated standard errors, and due to the shifting size of the military force due to the drawdown.

One of the limitations of these data, however, is that they involve an assessment of only a subset of gambling-related behavior. Other measures might include the percentage of personnel who engaged in any kind of betting activity in their lifetimes or in the past year, or the kinds of betting activities they engaged in, how often, and with whom. Consequently, we do not have a baseline measure of the prevalence of all types of gambling behavior among military personnel, regardless of whether that behavior was problematic in any way.

Furthermore, because no additional items on a person's involvement with gambling were included as part of the 1992 Worldwide Survey, we cannot reach any conclusions regarding the association of different types of gambling behaviors, such as wagering on

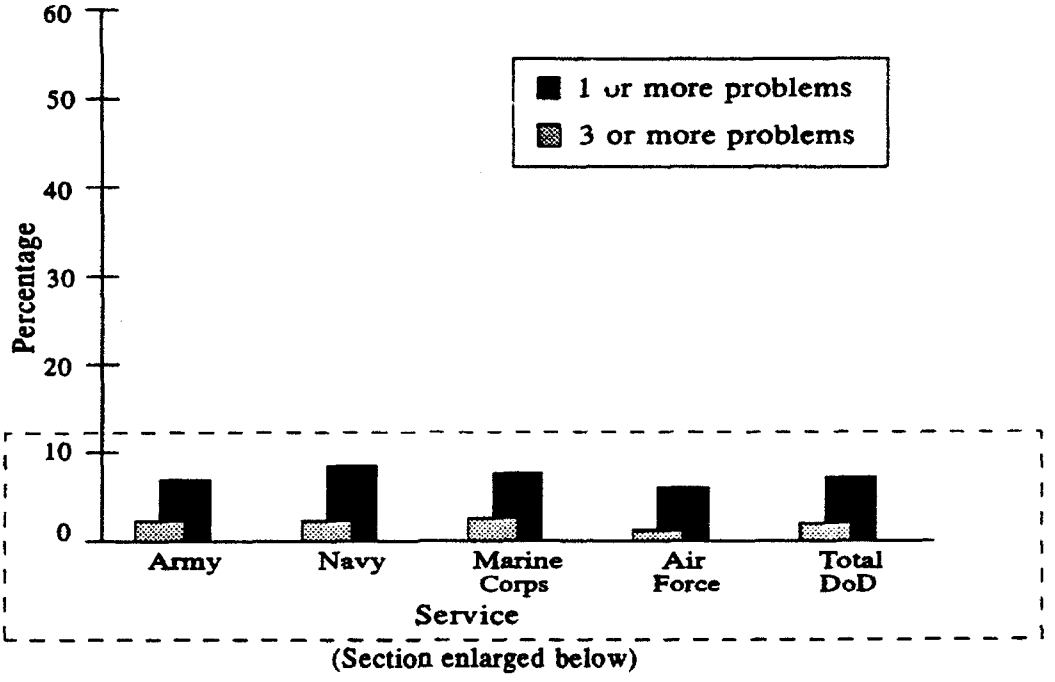
Table 12.9 Number of Gambling Problems (Lifetime)

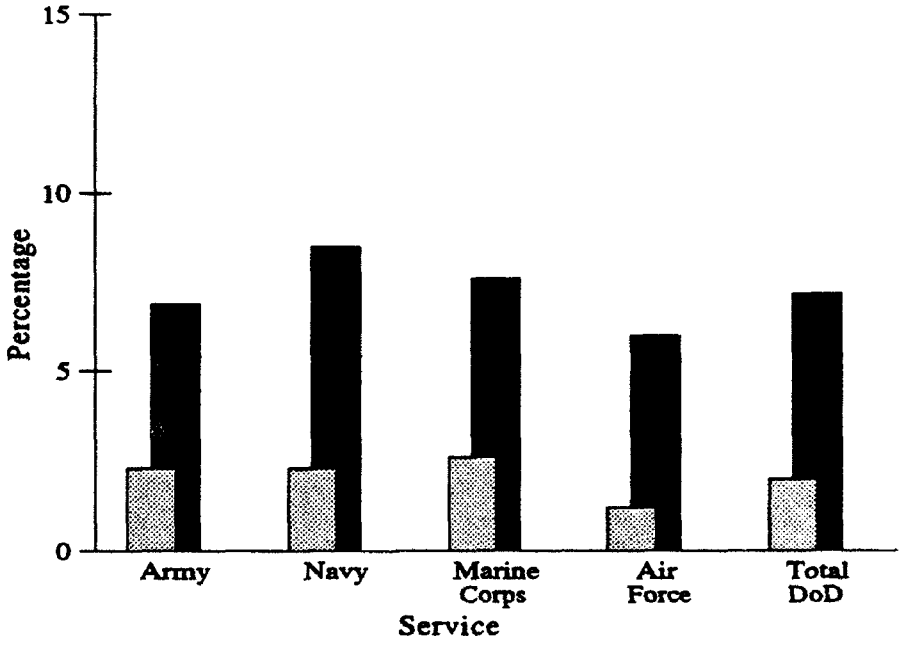
Number of Problems	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
0	93.1	(0.7)	91.5	(0.9)	92.4	(0.8)	94.0	(0.6)	92.8	(0.4)
1	3.1	(0.3)	3.7	(0.5)	3.7	(0.5)	3.7	(0.4)	3.5	(0.2)
2	1.5	(0.3)	2.6	(0.5)	1.3	(0.4)	1.0	(0.2)	1.6	(0.2)
3 or more	2.3	(0.3)	2.2	(0.2)	2.6	(0.4)	1.2	(0.2)	2.0	(0.2)

Note: Table values are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 12.1 Prevalence of Gambling Problems (Lifetime)





Note: Estimates have not been adjusted for sociodemographic differences among Services.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

games of skill (e.g., golf, pool) with problem or pathological gambling. Such information could be useful to policymakers in the military in developing interventions designed to discourage those gambling behaviors that are strongly associated with problem or pathological gambling.

An additional limitation of these data is that they are lifetime prevalence data; the 1992 Worldwide Survey did not address whether any of these gambling-related problems occurred in the past year or since an individual joined the military. Therefore, of the estimated 2% of all active duty personnel who had experienced sufficient multiple problems with gambling during their lifetimes and could be considered probable pathological gamblers, only a subset may currently (i.e., in the past year) have been showing signs of pathological gambling. At least some personnel may have been reporting about specific gambling-related problems that occurred prior to their joining the military but that had not occurred since. Further, for those individuals who had at least three gambling-related problems in their lifetimes, it is not possible to determine from the 1992 Worldwide Survey data whether these problems all co-occurred during a set period of time (e.g., within the past year), or whether some problems preceded others by a year or more. Additional study will be needed to explore the time period during which gambling-related problems occurred among military personnel. At the very least, however, these data indicate that an estimated 2% of all active duty personnel had recently been involved in gambling behavior that could be considered pathological, or else should be considered to be at extremely high risk for developing future gambling-related problems if they continue to gamble, or if they resume gambling. An additional 5% of military personnel, by virtue of having experienced one or two gambling-related problems in their lifetimes, should also be considered to be at increased risk.

Although these findings on gambling indicate that the lifetime prevalences of problem gambling (5.1%) and pathological gambling (2.0%) in the military were relatively low, these rates were slightly higher than the rates that Volberg and Steadman (1988; 1989a) observed using the South Oaks Gambling Screen among civilian populations in the Eastern United States (1.4 to 1.5%). However, it would probably be most accurate to consider these 1992 Worldwide Survey findings as representing only an initial exploration of the issue of pathological gambling in the military. These results should not be considered to be a conclusive indication that the prevalence of pathological gambling is higher in the military than among civilians. Further study of pathological gambling, both in the military and among civilians, would be needed before such a conclusion could be reached.

12.2.3 Problem Gambling and Alcohol Use

In this section, we examine the relationship between gambling problems and alcohol use. As indicated above, approximately 7% of all military personnel had experienced at least one gambling-related problem in their lives, and 2% could be

classified as probable pathological gamblers (Table 12.9). In addition, 5.2% of all active duty military personnel showed symptoms of alcohol dependence (Table 3.1), and 9.5% had received counseling or treatment for alcohol problems since they joined the military (Table 9.7). To the extent that gambling problems and alcohol problems are related, personnel who are identified as having one of the problems may need to be treated for the other as well.

Table 12.10 presents findings on the percentage of military personnel at each drinking level who also had problems with gambling; the percentage of personnel who experienced negative effects due to the alcohol use and who had gambling-related problems; and the percentage of personnel who received alcohol treatment since joining the military who had problems with gambling. Data on drinking levels indicate an increased likelihood of a person in the military being a problem or pathological gambler with higher drinking levels, although the vast majority (87.2%) of heavy drinkers had never experienced any gambling-related problems. An estimated 12.9% of heavy drinkers had at least one problem associated with gambling in their lifetimes, compared to 5.0% of abstainers and 7.1% of military personnel overall, regardless of drinking level.

We observed a stronger relationship between gambling and symptoms of alcohol dependence than we did between gambling and other negative effects due to alcohol use, or between gambling and treatment for alcohol problems. Nearly one in five (18.2%) personnel who showed symptoms of alcohol dependence also had at least one gambling-related problem, and more than 10% could be classified as probable pathological gamblers. In addition, slightly more than 10% of the persons who had been treated for alcohol problems since joining the military had at least one gambling-related problem, and 4.8% of the personnel who had been treated for alcohol problems could be classified as probable pathological gamblers. If these personnel are not screened for gambling-related problems when they enter alcohol treatment, these problems may very well go undetected. Furthermore, the results suggest that an even higher prevalence of gambling-related problems might be found among those personnel whose alcohol problems are currently going undetected or untreated.

12.3 Summary

In this chapter, we have presented findings on special issues that were addressed as part of the 1992 Worldwide Survey. Specifically, we presented findings related to participation in Operations Desert Shield and Desert Storm. For the first time, the Worldwide Survey also included questions that were designed to measure the prevalence of pathological gambling in the military.

Table 12.10 Alcohol and Problem Gambling Symptoms, Total DoD

Alcohol Measure	Number of Gambling Symptoms			
	0	1	2	3 or More
Drinking level				
Abstainer	95.0 (0.5)	2.5 (0.5)	1.2 (0.2)	1.3 (0.2)
Infrequent/Light or Moderate	94.5 (0.5)	2.6 (0.3)	1.6 (0.4)	1.3 (0.3)
Moderate/Heavy	91.4 (0.8)	4.8 (0.4)	1.9 (0.5)	1.9 (0.4)
Heavy	87.2 (1.0)	5.2 (0.9)	2.5 (0.6)	5.2 (0.8)
Negative effects				
Any serious consequence	85.1 (1.7)	5.2 (1.5)	2.0 (0.7)	7.7 (1.4)
Any time lost	85.7 (1.0)	5.3 (0.8)	3.6 (0.7)	5.4 (0.8)
Dependence	81.8 (2.3)	5.1 (1.3)	2.6 (0.9)	10.5 (1.8)
Alcohol treatment since entering service				
Yes	88.5 (1.5)	5.2 (0.8)	1.5 (0.4)	4.8 (1.2)
No	93.2 (0.4)	3.4 (0.3)	1.7 (0.2)	1.7 (0.2)

Note: Table entries are row percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

12.3.1 Operations Desert Shield and Desert Storm

An estimate of slightly more than 20% of all active duty military personnel served in Operations Desert Shield and Desert Storm. Approximately 30% of all Army personnel and over 40% of all Marine Corps personnel participated in the Operation (Table 12.1).

- An estimated 80.4% of all military personnel and from 61% to 90% of personnel in the individual Services decreased their use of alcohol while serving in the region or considered themselves to be nondrinkers during their period of service in the Middle East, most likely in response to the cultural prohibitions in the region against drinking alcohol (Table 12.3).

- Despite these cultural prohibitions, however, the alcohol use of 11.8% of all personnel serving in the region remained unchanged, and approximately 8% of all personnel increased their alcohol consumption during their service in the Operation. In addition, Navy (11.7%) and Air Force (12.0%) personnel showed higher rates of increases in alcohol use than Army (4.1%) or Marine Corps personnel (7.9%). The higher rates for the Navy and Air Force may have been due to their location away from the front lines, especially for Air Force personnel.

- Drug use during service in Desert Shield/Desert Storm was low. An estimated 95.6% did not use illicit drugs before or during the Operation. Drug use stayed the same or increased for less than 2% of all personnel serving in the Operation. Drug use during Desert Shield/Desert Storm increased or stayed the same for 2.6% of Navy personnel and 3.4% of Marine Corps personnel who served in the Operation.

- Nearly one out of every four individuals serving in the Gulf (23.0%) increased his or her smoking, resumed smoking, or started smoking for the first time during service in the Middle East. Among Marine Corps personnel, approximately 27% either increased their smoking, resumed smoking, or started smoking for the first time while serving in the region.

- The prevalence rates of heavy drinking (19.2% vs. 14.0%), past-12-month drug use (9.0% vs. 5.1%), and current smoking (38.7% vs. 34.9%) were significantly greater for personnel in the total DoD who served in Operation Desert Shield/Desert Storm, compared to personnel who did not (Tables 12.5 through 12.7). However, these differences appear to have been due to factors other than service in Desert Shield/Desert Storm, such as demographic differences between personnel who served or did not serve in the Middle East.

Taken together, these findings suggest that service in Operations Desert Shield and Desert Storm led to a short-term reduction in alcohol use during individuals' period of service in the Operation, but a sizable proportion (23.0%) of military personnel who served in the Operation either increased their smoking, resumed smoking after having quit, or started smoking for the first time during their period of service in the Operation. However, once these personnel were no longer serving in the Operation, their patterns of substance use appeared to shift back to reflect overall substance use patterns in the military.

12.3.2 Gambling in the Military

The 1992 Worldwide Survey included eight items to measure the lifetime prevalence of pathological gambling in the military. Individuals giving an affirmative answer to at least one item were considered to be problem gamblers, and individuals

giving three or more affirmative answers were considered to be probable pathological gamblers (Tables 12.8 and 12.9, and Figure 12.1).

- For total DoD, 5.1% of personnel could be classified as potential problem gamblers, and an additional 2.0% could be classified as probable pathological gamblers. Prevalence rates for the Services were similar to those for the total DoD.
- Problems with gambling were more common among heavier drinkers than among abstainers and lighter drinkers, but nearly 90% of heavy drinkers had never experienced problems with gambling.
- Less than 5% of all military personnel who had been treated for alcohol problems since entering the military could be classified as probable pathological gamblers, but the prevalence of pathological gambling among personnel showing symptoms of alcohol dependence was over 10%.

These findings strongly suggest the need for further study to determine possible causes and correlates of gambling problems and pathological gambling among military personnel. Furthermore, the findings on the relationship between alcohol use and gambling indicate that pathological gambling was more prevalent among personnel showing symptoms of alcohol dependence than it was among personnel who made it into treatment for their alcohol problems.

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APPENDIX A

SAMPLING DESIGN

APPENDIX A

SAMPLING DESIGN

A.1 Design Parameters

Since 1985, the primary objective of the Worldwide Surveys' sampling designs has been to estimate the population proportions associated with the responses and reporting domains listed in Table A.1. Originally, DoD required each estimate of these parameters to have a coefficient of variation (CV) of 0.05 or less. However, our subsequent design optimizations revealed that the attainment of this level of precision for estimates of the proportion of senior noncommissioned officers (NCOs), warrant officers, and senior officers with a heavy drinking problem caused the minimum precision requirements for the other reporting groups to be substantially exceeded. Therefore, we relaxed the precision requirements for these reporting domains.

To satisfy the precision requirements, we developed equations to describe the variable survey costs and sampling variances assuming various features about the design. These features, collectively termed "design effects," included estimates of the intracluster correlation among individuals in the same first-stage unit, the first- and second-stage stratum sizes, and the nonresponse subsampling fraction. We obtained estimates of the data collection costs and the sampling variances from previous surveys, and we obtained the minimum cost allocations by solving the equations simultaneously subject to the precision constraints.

Any evaluation of the efficiency of the 1985 and 1988 sampling designs must consider the constraints under which they were developed. To do this, we calculated the CVs of the parameter estimates obtained from both surveys assuming the design effects that were used in the design optimization. The results of this evaluation are presented in Table A.1. Notice that these two earlier surveys met the precision requirements for each of the parameter estimates except one: marijuana use in the past 30 days among junior officers. This was caused by the extremely low prevalence rate (less than 1%) for this reporting domain. However, even with a CV of 0.126, the 95% confidence interval for this prevalence rate was quite small (i.e., plus or minus 0.25%). The CVs for other 1988 estimates were, in general, higher than the 1985 CVs because of the decline in drug and alcohol use among military personnel.

A.2 First-Stage Sampling Frame

We constructed the sampling frame in two stages. At the first stage, we combined geographically proximal organizational units into first-stage sampling units (FSUs); at the

Table A.1 Efficiency of the 1985 and 1988 Sampling Designs

Response	Reporting Domain	Estimated Proportion[a] 1985	Estimated Proportion[a] 1988	Coefficient of Variation 1985	Coefficient of Variation 1988
Marijuana use in past 30 days	Army	0.09	0.04	0.006	0.009
	Navy	0.07	0.04	0.009	0.013
	Marine Corps	0.08	0.01	0.013	0.032
	Air Force	0.03	0.01	0.014	0.032
	E1 - E3	0.11	0.06	0.007	0.010
	O1 - O3	0.01	0.01	0 151	0.126
Illicit drug use other than marijuana in past 30 days	Army	0.06	0.04	0.007	0.010
	Navy	0.08	0.03	0.008	0.013
	Marine Corps	0.07	0.04	0.014	0.020
	Air Force	0.03	0.02	0.013	0.019
Heavy drinking	Army	0.25	0.20	0.003	0.004
	Navy	0.25	0.15	0.004	0.006
	Marine Corps	0.29	0.24	0.006	0.007
	Air Force	0.16	0.15	0.005	0.005
	E1 - E3	0.35	0.25	0.003	0.004
	E4 - E6	0.23	0.19	0.008	0.009
	E7 - E9[b]	0.13	0.10	0.051	0.072
	W1 - W4[b]	0.12	0.09	0.287	0.347
	O1 - O3	0.07	0.06	0.051	0.055
	O4 - O10[b]	0.04	0.03	0.149	0.142

[a]Proportion of the parameter estimate assuming design effects used in the 1985 design optimization.

[b]The attainment of required precision levels for these reporting domains caused the precision of the other reporting domains to substantially exceed the minimum level. Therefore, we relaxed the precision requirements for these pay grade groups.

second stage, the frame comprised eligible active-duty military personnel attached to selected FSUs.

We obtained personnel counts from the 30 September 1991 version of the Active Duty Military Personnel File maintained by the Defense Manpower Data Center (DMDC) for use as the data source for construction of the first-stage frame. We defined FSUs on the basis of Unit Identification Codes (UICs) and five-digit zip codes in the continental United States (CONUS) or Army Post Office/Fleet Post Office (APO/FPO) numbers overseas. To ensure that the group-administered questionnaire was administered in a cost-effective fashion, we required each FSU to contain one site (i.e., zip/APO/FPO number) with at least 300 available persons. We designated these as "nucleus sites." All other sites (designated as "satellite sites") were associated with the closest nucleus site. The minimum size requirements for nucleus sites are shown in Table A.2 and were based

on the rates at which 1988 sample persons were available for group sessions where our field teams administered questionnaires.

In 1988, many of the FSUs representing large installations contained hundreds of military units. This situation complicated the data collection effort for the Military Liason Officers (MLOs) because they often were faced with coordinating the data collection effort with individual units. To ameliorate this problem for the 1992 survey, we subdivided nucleus sites that exceeded both the maximum persons and the maximum UICs listed in Table A.2 until each new FSU had either fewer persons or fewer UICs than the maximum. The maximum size criteria were the average number of persons and the average number of UICs for nucleus sites on the September 1991 DMDC data file.

Table A.2 Size Requirements for Nucleus Sites

Military Service	Minimum Persons	Maximum Persons	Maximum UICs
Army	360	2,954	64
Navy*	476	2,431	25
Marine Corps*	400	3,115	30
Air Force	356	3,709	40

*Afloat units were required to have a minimum of 1,200 persons to be considered a nucleus site.

Table A.3 summarizes the first-stage stratification for the 1992 Worldwide Survey; these data are discussed in Sections A.2.1 through A.2.5.

A.2.1 Construction of Army FSUs

We constructed Army FSUs from organizational units identified by the UIC. We determined the geographic location of a UIC by its zip code if the unit was in the U.S. and by APO number otherwise. The Army first-stage sampling frame comprised 299 FSUs and accounted for 617,227 (96.6%) of the 638,931 Army personnel with 12 or more months of service on the 30 September, 1991 version of the Active-Duty Master Personnel File provided by the DMDC. Army personnel not accounted for on the sampling frame had missing or unusable zip/APO numbers. After review by the Army Headquarters Military Liason Officer (HMLO), we reassigned 13 FSUs in Southwest Asia and 34 FSUs in Germany to the Americas region.

Because basic trainees were ineligible for the survey, the personnel counts provided by DMDC excluded 66,849 Army personnel with less than 12 months of service. This was done so that the size measure assigned to each FSU was approximately

Table A.3 1992 Worldwide Survey First-Stage Stratum Sizes

First-Stage Stratum		First-Stage Units		Personnel[a]	
Cost Region	Service	Frame	Sample	Frame	Sample
Americas	Army	158	13	379,734	5,110
	Navy	209	9	438,118	3,917
	Marine Corps	48	4	134,165	1,619
	Air Force	140	11	359,309	4,274
	Total	555	37	1,311,326	14,920
North Pacific	Army	24	2	30,576	537
	Navy	6	2	10,785	873
	Marine Corps	4	2	11,010	901
	Air Force	9	2	24,050	804
	Total	43	8	76,421	3,115
Other Pacific	Army	6	2	17,694	958
	Navy	15	2	23,943	845
	Marine Corps	6	2	10,738	885
	Air Force	5	2	7,562	828
	Total	32	8	59,937	3,516
Europe & Southwest Asia	Army	111	6	189,223	2,367
	Navy	10	2	16,659	843
	Marine Corps[b]	2	1	961	300
	Air Force	32	2	63,808	826
	Total	155	11	270,651	4,336
Total	Army	299	23	617,227[c]	8,972
	Navy	240	15	489,505[d]	6,478
	Marine Corps	60	9	156,874[e]	3,705
	Air Force	186	17	454,729[f]	6,732
	Total	785	63	1,718,335	25,887

[a]Active duty personnel with 12 or more months of service as of 30 September 1991.

[b]Marine Corps units in Europe were attached to Navy FSUs in Europe for sample selection.

[c]Excludes 66,849 Army personnel with less than 12 months of service.

[d]Excludes 61,543 Navy personnel with less than 12 months of service.

[e]Excludes 25,767 Marine Corps personnel with less than 12 months of service.

[f]Excludes 30,754 Air Force personnel with less than 12 months of service.

proportional to the number of eligible persons in the FSU. This action only affected the first-stage size measures; persons other than basic trainees with less than 12 months of service retained their eligibility and were sampled at the second stage.

A.2.2 Construction of Navy FSUs

We constructed Navy FSUs from organizational units identified by the UIC. We determined the geographic location of an ashore unit by its zip code if the unit was in the U.S. and by FPO number otherwise. We identified afloat units by FPO numbers assigned to ships. The geographic location we used for afloat units was the state/country of the unit's home port.

The Navy first-stage sampling frame comprised 240 FSUs, of which 80 contained afloat nucleus units, and accounted for 489,505 (97.2%) of the 503,804 Navy personnel with 12 or more months of service on the 30 September 1991 version of the Active-Duty Master Personnel File provided by the DMDC. Navy personnel not accounted for on the sampling frame had missing or unusable zip/FPO numbers or were assigned to ships that had been decommissioned since the file was prepared. The personnel counts provided by DMDC excluded 61,543 Navy personnel with less than 12 months of service.

A.2.3 Construction of Marine Corps FSUs

We constructed Marine Corps FSUs from organizational units identified by the Reporting Unit Code (RUC). As we did with the Navy, we determined the geographic location of an ashore unit by its zip code if the unit was in the U.S. and by FPO number otherwise. We identifed afloat units by FPO numbers assigned to ships. The geographic location we used for afloat units was the state/country of the unit's home port.

The Marine Corps first-stage frame comprised 60 FSUs, of which 7 contained afloat nucleus units. In addition, we associated the 961 Marine Corps personnel in Europe with Navy FSUs in Europe (explained in Section A.4.1). The frame accounted for 156,874 (93.4%) of the 167,918 Marine Corps personnel with 12 or more months of service on the 30 September 1991 version of the Active-Duty Master Personnel File provided by the DMDC. Marine Corps personnel not accounted for on the sampling frame had missing or unusable zip/FPO numbers. The personnel counts provided by DMDC excluded 25,767 Marine Corps personnel with less than 12 months of service. After review by the Marine Corps HMLO, we reassigned two FSUs in Southwest Asia and one afloat FSU to the Americas region.

A.2.4 Construction of Air Force FSUs

We constructed Air Force FSUs from organizational units identified by the UIC. We determined the geographic location of personnel assigned to a UIC by its zip code if the unit was in the U.S. and by APO number otherwise.

The Air Force first-stage sampling frame comprised 186 FSUs and accounted for 454,729 (95.9%) of the 474,352 Air Force personnel with 12 or more months of service on the 30 September 1991 version of the Active-Duty Master Personnel File provided by the DMDC. Air Force personnel not accounted for on the sampling frame had missing or unusable zip/APO numbers or were assigned to bases that were in the process of closing. The personnel counts provided by DMDC excluded 30,754 Air Force personnel with less than 12 months of service.

A.2.5 First-Stage Stratification

We assigned each FSU to one of 16 first-stage strata defined by the intersection of the four Services with four geographic regions of the world. These regions, defined on the basis of data collection costs, comprised (a) the Americas (including Greenland and Iceland), (b) the North Pacific (i.e. Japan, China, and Korea), (c) the Other Pacific (including the Indian Ocean), and (d) Europe and Southwest Asia. We imposed geographic strata to control the worldwide distribution of the sample, an important cost consideration.

A.3 Second-Stage Sampling Frame

We defined second-stage sampling units to be personnel record numbers so that we could account for any personnel changes that took place between the times of sample selection and data collection at a sample FSU. Soon after we selected the first-stage sample, we selected a random sample of record numbers. Then, prior to data collection, the Service personnel centers identified the individuals named on the sample record numbers as applied to the actual personnel files. If a decrease in the personnel complement had occurred since we selected the first-stage sample, some of the sample record numbers were empty; we accommodated an increase by generating a surplus of sample record numbers. We used these procedures successfully in the 1982, 1985, and 1988 surveys, clearly demonstrating their operational practicality.

We stratified the second-stage frame by pay grade group (the rostering of individuals being by pay grade group) in order to meet the precision requirements that were specified for the 1985 survey. We allocated the second-stage sample to these strata to obtain self-weighting samples for each pay grade group within the first-stage strata. Table A.4 shows the distributions of personnel across second-stage strata for both the survey population and the sample.

Table A.4 1992 Worldwide Survey Second-Stage Stratum Sizes

Second-Stage Stratum		Number of Personnel*			
		Active Duty Population		Sample	
Service	Pay Grade Group				
Army	E1-E4	297,181	45.6	1,705	19.0
	E5-E6	185,506	28.5	2,617	29.2
	E7-E9	68,489	10.5	2,571	28.7
	W1-W4	14,346	2.2	579	6.5
	O1-O3	52,644	8.1	648	7.2
	O4-O10	33,646	5.2	852	9.5
		651,812	100.0	8,972	100.0
Navy	E1-E4	222,031	41.8	1,332	20.6
	E5-E6	189,895	35.7	2,112	32.6
	E7-E9	49,978	9.4	1,851	28.6
	W1-W4	2,965	0.6	201	3.1
	O1-O3	41,165	7.7	434	6.7
	O4-O10	25,266	4.8	548	8.5
		531,300	100.0	6,478	100.0
Marine Corps	E1-E4	109,597	59.8	981	26.5
	E5-E6	40,035	21.9	1,058	28.6
	E7-E9	14,289	7.8	907	24.5
	W1-W4	1,919	1.0	205	5.5
	O1-O3	11,921	6.5	267	7.2
	O4-O10	5,423	3.0	287	7.7
		183,184	100.0	3,705	100.0
Air Force	E1-E4	182,216	37.6	1,376	20.4
	E5-E6	157,552	32.5	2,036	30.2
	E7-E9	50,085	10.3	1,834	27.2
	W1-W4	0	0.0	0	0.0
	O1-O3	58,689	12.1	615	9.1
	O4-O10	35,613	7.4	871	12.9
		484,155	100.0	6,732	100.0
Total	E1-E4	811,025	43.8	5,394	20.8
	E5-E6	572,988	31.0	7,823	30.2
	E7-E9	182,841	9.9	7,163	27.7
	W1-W4	19,230	1.0	985	3.8
	O1-O3	164,419	8.9	1,964	7.6
	O4-O10	99,948	5.4	2,558	9.9
		1,850,451	100.0	25,887	100.0

*As of 31 March 1992 (excludes basic trainees and persons attending Service academies).

A.4 Sample Allocation and Selection

A.4.1 Sample Allocation

We allocated the sample in the same way as we did in 1985 and 1988. The original sample allocation was determined jointly by the precision requirements documented in the 1985 final report (Bray et al., 1986) and by the costs of data collection in the different regions of the world. Because variances are not estimable if fewer than two FSUs are selected in any first-stage stratum, we imposed a minimum allocation of two FSUs per stratum. Allocating two FSUs to the Marine Corps in Europe introduced a problem because of the very few Marines stationed there (Table A.3). To prevent the unwarranted oversampling of Marines in this stratum, we associated Marine Corps personnel in Europe with Navy FSUs.

We allocated the first-stage sample of 63 primary FSUs to the Services within the four geographic cost strata. In addition, we allocated an alternate FSU to each stratum for use in the event that a primary FSU was no longer in operation (e.g., base closing or ship decommissioning). After we selected the sample, we activated three alternate FSUs for this purpose.

We selected approximately 404 sample individuals per FSU with pay grade groups disproportionately sampled. We oversampled the officer grades relative to the enlisted grades, reflecting the generally smaller drug and alcohol use domains in the former (thereby requiring a larger sample size for comparable levels of precision).

A.4.2 Composite Size Measures

We constructed composite size measures for selecting the first-stage sample by using the number of persons in each pay grade group in each FSU. Notationally, first-stage strata were denoted by a = 1, 2, ..., 15. FSUs listed in the frame were identified by the subscript i = 1, 2, ..., $N_1(a)$, and in the sample by i = 1, 2, ..., $n_1(a)$. The range of the subscript differentiates between units in the frame and units in the sample. The total number of FSUs in the frame classified into the a-th stratum, N(a), and the total first-stage sample size selected from the a-th stratum, n(a), are shown in Table A.2.

Second-stage strata were identified by the subscript b = 1, 2, ..., 6. Second-stage sampling units (SSUs) in each of the pay grade strata were identified by the subscript j = 1, 2, ..., $N_2(a, i, b)$, denoting units in the second-stage frame, or by j = 1, 2, ..., $n_2(a, i, b)$, denoting units in the second-stage sample. We computed the values $N_2(a,i,b)$ using the personnel counts in each of the organizational units.

In calculating composite size measures, our objective was to make equal, for specified values of the a-subscript and the b-subscript, the expected frequencies with

which SSUs were selected into the sample, given the sample size requirements derived from the cost and variance equations. Let:

$\pi(a,i)$ = the expected frequency of selecting the i-th FSU from the a-th stratum in samples of size $n_1(a)$, and,

$\pi(j \mid a,i,b)$ = the expected frequency of selecting the k-th SSU from the b-th pay grade stratum conditionally on the selection of the i-th FSU, given the second-stage sample sizes.

Thus, $$\pi(a,i) = n_1(a) \bullet \frac{S(a,i)}{S(a)} \quad .$$

where $$S(a) = \sum_{i \epsilon a} S(a,i) \quad ,$$

and

$$\pi(j \mid a,i,b) = \frac{n_2(a,i,b)}{N_2(a,i,b)} \quad , \; j = 1, 2, \ldots, N_2(a,i,b).$$

Computing the composite size measures is equivalent to finding values S(a,i) and $n_2(a,i,b)$, such that

$$\begin{aligned} \pi(a,i,b,j) &= \pi(a,i) \bullet \pi(j \mid a,i,b) \\ &= K(a,b), \end{aligned}$$

a constant within values of the a-subscript and the b-subscript. The solutions are given by:

$$S(a,i) = \sum_{b=1}^{6} f(a,b) \bullet N_2(a,i,b)$$

and

$$n_2(a,i,b) = \frac{n_2(a) f(a,i) N_2(a,i,b)}{S(a,i)} \quad ,$$

where

$f(a,b)$ = the sampling frequency used in the b-th pay grade group relative to the other pay grade groups in the a-th first-stage stratum, and,

$n_2(a)$ = the targeted second-stage sample size in the a-th first-stage stratum.

With reference to the values f(a,b), we allocated SSUs via the cost and variance equations to the pay grade group strata.

A.5 Randomization Procedure

Because FSUs varied considerably with respect to numbers of personnel, we selected the first-stage sample with minimum replacement (Chromy, 1981). The minimum replacement procedure is equivalent to without-replacement selection if none of the $\pi(a,i)$ values exceeds unity. Otherwise, the procedure achieves the expected frequencies over repeated samples and, at any specific drawing of the sample, comes within one selection of the FSU's expected allocation. This minimum replacement method is superior to alternative with- or without-replacement schemes in that it controls the number of selections assigned to a sampling unit so that the actual allocation and the proportional-to-size allocation differ by less than one.

We controlled the distribution of sample FSUs across major commands by using a sequential selection algorithm from a controlled ordering of the sampling frame. We applied the selection procedure within each stratum and began by picking an FSU at random with probability $\pi(a,i)$. Given the random starting point, selections proceeded sequentially in a circular fashion through the frame until we returned to the starting point. This sequential selection from a controlled circular ordering has the effect of implicit stratification in the same way that a systematic selection imposes stratification on an ordered list. The random starting point for the sequential selection gives the procedure the added feature that every pair of FSUs on the frame has a chance of appearing together in the sample. This feature is a necessary condition for strictly unbiased estimation of sampling variances.

Sequential selection from an ordered frame allowed us to control the distribution of sample members by major command. To implement this procedure, we assigned FSUs to a major command on the basis of the organizational unit's affiliation. FSUs that contained units from multiple major commands were assigned to the major command that accounted for the most personnel.

At the second stage, the Service personnel centers selected sample individuals with equal probability and without replacement from among the total personnel in the pay grade group at the time of data collection. Sample persons not attending the group administrations became part of the nonresponse follow-up. The proposed randomization procedure produced a self-weighting sample of individuals within pay grade groups and first-stage strata. We present details of the calculation of sampling weights in Appendix B.

References for Appendix A

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APPENDIX B

SAMPLE WEIGHTING AND ESTIMATION PROCEDURES

APPENDIX B

SAMPLE WEIGHTING AND ESTIMATION PROCEDURES

B.1 Sample Weighting

In this section, we describe how we assigned sample weights to sample members to reflect differences in their sample selection rates, their survey eligibility rates, and their response rates. We also present an evaluation of the procedure we used to adjust the weights for the potential biasing effects of systematic nonsampling errors caused by differential nonresponse.

B.1.1 Initial Sample Weights

We calculated initial sample weights as the inverse of the probabilities of selection at each stage of the design. At the first stage, the expected frequency of selecting the i-th FSU from the a-th first-stage stratum was

$$\pi(a,i) = n_1(a) \bullet S(a,i) / S(a),$$

where

$n_1(a)$ = the number of FSUs selected from the a-th stratum,

$S(a,i)$ = the composite size measure assigned to the i-th FSU, and

$S(a)$ = the sum of the composite size measures in the a-th stratum.

At the second stage, we selected simple random samples of persons from each pay grade group with sampling rates that attained the desired stratum sizes and made the overall selection probabilities assigned to persons in the same first- and second-stage strata equal whenever possible. The probability of selecting the j-th person from the b-th pay grade stratum conditional on the selection of the i-th FSU from the a-th first-stage stratum was

$$\pi(j \mid a,i,b) = \text{Min}[1, n_2(a,b) / N(a,i,b)] ,$$

where

$N(a,i,b)$ = the total number of persons in the b-th pay grade stratum of the i-th FSU from the a-th first-stage stratum, and

$n_2(a,b)$ = the targeted second-stage sample size for the b-th paygrade stratum for FSUs in the a-th first-stage stratum.

Thus, the initial sample weight assigned to the j-th person of the b-th pay grade stratum of the i-th FSU is

$$w(a,i,b,j) = [\pi(a,i) \bullet \pi(j \mid a,i,b)]^{-1} .$$

We assigned this initial sample weight to each of the 25,887 persons selected for the sample.

B.1.2 Adjustments for Survey Eligibility

As in previous Worldwide Surveys, the 1992 Worldwide Survey population comprised all military personnel on active duty at the time we selected the sample (February and March, 1992) and who were still on active duty when we conducted the survey (April to June, 1992). The only exceptions were:

- Basic trainees,
- Service academy cadets and midshipmen,
- Persons undergoing a permanent change of station (PCS), and
- Persons absent without leave (AWOL).

We excluded basic trainees, academy cadets, and midshipmen because of their lack of military experience. We excluded persons who were either undergoing a PCS or were AWOL because of the difficulties associated with contacting these persons during the relatively short data collection period.

During the group administrations (Phase 1) of the survey questionnaire, we determined the eligibility status of all 25,887 sample members. We considered the 4,667 persons who had left active duty, were PCS, or were AWOL to be ineligible for the survey. We considered the 5,624 persons who were deployed, ill, on leave, or on temporary duty to be eligible but unavailable for the survey. We also considered eligible the 1,525 persons who were available but did not attend the group administrations. To give all eligible sample members an opportunity to participate in the survey, we mailed questionnaires (Phase 2) to all eligible persons not attending the group administrations.

We could not determine the exact size of the survey population (i.e., the total number of persons eligible for the survey) because of the ever-changing assignment status of military personnel. Instead, we applied the observed eligibility rates for sample members to the March 1992 personnel counts provided by the Defense Manpower Data Center (DMDC) to obtain accurate estimates of the total number of eligible persons in each of the 92 sampling strata defined by intersection of Service, region, and pay grade group. To ensure stable sampling estimates, we collapsed 6 sampling strata with fewer than 30 respondents to form 86 post-strata. Then, we applied the observed eligibility rate

for each post-stratum to the corresponding personnel count to obtain the estimated number of eligible persons.

We estimated the number of eligible persons in each post-stratum as follows. First, we defined the following eligibility indicator for the j-th sample member in the b-th pay grade group in the i-th FSU of the a-th first-stage stratum:

$$e(a,i,b,j) = \begin{cases} 1 & \text{if he/she was eligible for the survey, and} \\ 0 & \text{otherwise.} \end{cases}$$

We set this indicator to one for the 21,220 sample members whom we classified as eligible for the survey.

Then, we estimated the number of eligible persons in each post-stratum c as:

$$\hat{N}_e(c) = \frac{\sum_{a,b \in c} \sum_{i \in a} \sum_{j \in b} w(a,i,b,j) \cdot e(a,i,b,j)}{\sum_{a,b \in c} \sum_{i \in a} \sum_{j \in b} w(a,i,b,j)} \cdot N(c) ,$$

where

N(c) = the March 1992 personnel count for post-stratum c.

Table B.1 compares these estimates to the entire active duty population by Service and pay grade group. In the next section, we describe how we adjusted the initial sample weights of survey participants so that the sum of their adjusted weights within a post-stratum equaled the estimated number of eligible persons in the post-stratum.

B.1.3 Adjustments for Nonresponse

We considered a sample member to be a respondent if he/she returned a usable questionnaire. Accordingly, we assigned the following response indicator to the j-th person of the b-th pay grade stratum in the i-th FSU of the a-th first-stage stratum:

$$r(a,i,b,j) = \begin{cases} 1 & \text{if he/she provided a usable questionnaire, and} \\ 0 & \text{otherwise.} \end{cases}$$

We set this indicator to one for the 16,395 sample members who provided a usable questionnaire.

Table B.1 Comparison of Total Personnel and Eligible Personnel

Pay Grade	Service									
	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
E1-E4	297,181	190,621 (21,039)	222,031	189,898 (54,301)	109,597	90,110 (18,051)	182,216	148,391 (17,065)	811,025	619,021 (63,261)
E5-E6	185,506	131,605 (11,288)	189,895	158,586 (21,954)	40,035	36,863 (2,493)	157,552	142,606 (11,247)	572,988	469,661 (27,236)
E7-E9	68,489	51,263 (5,455)	49,978	43,415 (4,270)	14,289	13,128 (1,672)	50,085	44,944 (2,841)	182,841	152,751 (7,674)
W1-W4	14,346	11,549 (1,769)	2,965	2,167 (277)	1,919	1,697 (354)	0	0 (0)	19,230	15,413 (1,825)
O1-O3	32,644	40,145 (4,150)	41,165	29,796 (5,015)	11,921	10,263 (1,248)	58,689	51,061 (7,150)	164,419	131,265 (9,752)
O4-O10	33,646	29,881 (11,122)	25,266	19,576 (3,723)	5,423	5,212 (2,383)	35,613	32,977 (10,621)	99,948	87,646 (16,007)
Total	651,812	455,064 (29,040)	531,300	443,437 (68,359)	183,184	157,275 (20,505)	484,155	419,980 (22,611)	1,850,451	1,475,757 (80,253)

Note: Total personnel is the number of persons, excluding cadets, midshipmen, and basic trainees who were on active duty as of March 31, 1992. Eligible personnel is the estimated number of these persons who had some chance of being selected for the survey. The standard errors for the estimated number of eligible persons are given in parentheses beneath the estimates.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

To force the sum of the adjusted weights of respondents to equal the estimated number of eligible persons, we calculated the following adjustment factor for each post-stratum c:

$$A(c) = \frac{\hat{N}_e(c)}{\sum_{a,b \in c} \sum_{i \in a} \sum_{j \in b} w(a,i,b,j) \cdot r(a,i,b,j)} .$$

Then, we applied the adjustment factor to the initial sampling weight of each respondent to obtain the following adjusted weight:

$$w^*(a,i,b,j) = A(c) \cdot w(a,i,b,j) \cdot r(a,i,b,j).$$

Nonzero values of this weight were assigned to the 16,395 respondents.

B.1.4 Evaluation of the Nonresponse Adjustment Procedure

The nonresponse adjustments that we described above are based on the assumption that sample members can be partitioned into cells, or post-strata, within which the mean of the responses for nonrespondents, had they been obtained, would be similar to the same mean for the respondents. The adjustment procedure provided a single or linear adjustment factor that we applied to the initial sample weights of all respondents within a post-stratum.

If the nonrespondents and respondents in a post-stratum in fact have the same average value for a given observed variable, the linear adjustment procedure provides unbiased parameter estimates. In this case, the corresponding standard errors estimate the uncertainty associated with the parameter estimates. However, if nonrespondents and respondents behave differently, then biases of unknown magnitude and sign introduce additional uncertainty that is not included in the standard errors. This additional uncertainty is attributable to nonresponse bias.

To evaluate how well the linear nonresponse adjustment compensated for nonresponse bias, we developed a second response model that assumed a changing or nonlinear response pattern and then compared the estimates provided by each approach. The nonlinear response model assumed that "late" (i.e., Phase 2) respondents were more like nonrespondents than like "early" (i.e., Phase 1) respondents. Accordingly, the nonlinear adjustment provided separate adjustment factors for Phase 1 and Phase 2 respondents rather than the single adjustment factor provided by the linear adjustment. We originally used the nonlinear procedure to evaluate the nonresponse adjustments used in the 1982 Worldwide Survey (Bray et al., 1983; Appendix F).

The nonlinear response model assumed a commonality between late respondents and nonrespondents which seemed reasonable for the Worldwide Surveys. As Table 2.1 in Chapter 2 shows, 78.2% of the eligible sample members not attending the group administrations (i.e., Phase 1 nonrespondents) were either on temporary duty, on leave, ill, or deployed. That is, most Phase 2 respondents and most nonrespondents were away from their home station when the group administrations took place. From the standpoint of substance use, the nonrespondents may have had more in common with the Phase 2 respondents than with the Phase 1 respondents, especially regarding short-term drug and alcohol use.

If most Phase 1 nonrespondents were away from their home stations, and if we postulate that a person's drug and alcohol use may change while he/she is away, then the nonresponse adjustment strategy should focus on the responses of persons who were away from home when the survey was conducted. With this in mind, we calculated a second set of sample weights where we adjusted only the initial sample weights of Phase 2 respondents for nonresponse rather than adjusting the entire set of respondents.

The decision about whether to use the linear or nonlinear nonresponse adjustment depended on whether response patterns changed during the data collection period. If the change was significant, the linear adjustment would be biased, whereas the nonlinear adjustment would reduce or eliminate nonresponse bias. If the response patterns did not change over time, both adjustments would provide the same estimates. However, the standard errors of the nonlinear estimates generally would have been significantly larger than those obtained using the linear adjustment. Unfortunately, the low response rate (33.2%) to the Phase 2 mail followup precluded the use of the nonlinear adjustment. Instead, we decided that the linear adjustment, which was spread over all respondents, was less vulnerable to spurious response patterns than the nonlinear adjustment.

In spite of the potential instability of the nonlinearly adjusted weight, we used it to generate separate prevalence rates for comparison to the linearly adjusted rates. The comparison was useful because, if the estimates were similar, we would obtain evidence that the nonrespondents resembled the Phase 1 respondents as well as the Phase 2 respondents and that the linear adjustment procedure performed well. Conversely, if the estimates were different, we would obtain evidence that the response patterns changed significantly during the later phase of data collection. In this situation, we evaluated the effect of these changes on the error rates associated with confidence intervals for population prevalence rates.

We estimated the nonresponse biases associated with the linearly adjusted prevalence rates for each Service by assuming that the corresponding nonlinear rates were essentially free of nonresponse bias. To protect against spurious conclusions about either the presence or absence of bias, we required that differences between the linear and

nonlinear estimates be statistically significant at the 0.01 level. At this level, we were more than 90% certain of detecting differences of 5% or more assuming an average design effect of 1.5 and a 0.5 correlation between the estimates.

As Table B.2 shows, most prevalence rates were free of noticeable nonresponse bias. As we expected, the 30-day use measures were most sensitive to differences between the linear and nonlinear adjustments. Among these, the abstainer and infrequent/light 30-day drinking levels for the Marine Corps were the most significant. The magnitude of the bias of these estimates relative to their standard errors raises concern about their reliability (Kish, 1965). In spite of this, neither bias was large enough to affect our conclusions about changes in alcohol use by Marine Corps personnel between 1988 and 1992.

B.2 Estimation

In this section, we discuss the statistical estimation procedures we used for the complex sample design of the 1992 survey. We produced estimates for different reporting domains such as branch of Service, race/ethnicity, sex, age, and family status. The main types of estimates we 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. We also computed differences, such as the change in mean ounces of alcohol (ethanol) consumed or in the percentage of persons reporting drug use between 1988 and 1992. In addition, we fit multiple linear regression models and logistic regression models to estimate the combined effect of sociodemographic and psychological/behavior variables on a variety of dependent variables.

We used estimation procedures appropriate for the two-stage, deeply stratified, two-phase design (e.g., see Cochran, 1977). The first step in the estimation process was the development of response-adjusted analysis weights (as discussed in Section B.1). Next, we examined frequencies of categorical variables to ensure that there was an adequate sample size in each level. We also examined frequencies of continuous variables, such as age and ethanol consumption, and investigated and resolved unreasonably large or small values in the data.

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, and then dividing to obtain the ratio. Because ratio estimates are nonlinear statistics, their sampling variance cannot be expressed in closed form. We calculated variance approximations using first-order Taylor series linearizations. The estimation of regression coefficients is a multivariate extension of the Taylor series linearization for ratios.

Table B.2 Estimated Nonresponse Biases of Substance Use Measures[a]

	Army	Navy	Marine Corps	Air Force	DoD
Alcohol Use, Past 30 Days					
Abstainer	-1.62 (1.0)	3.48 (1.6)	2.91[b] (0.6)	0.16 (0.4)	0.90 (0.7)
Infrequent/Light	-0.72 (0.9)	-0.01 (1.0)	-2.83[b] (0.8)	0.20 (0.3)	-0.47 (0.4)
Moderate	-0.60 (0.9)	1.12 (2.0)	0.07 (1.2)	0.08 (0.4)	0.18 (0.7)
Moderate/Heavy	2.57[b] (0.7)	-3.87 (3.1)	0.20 (1.8)	-0.03 (0.3)	-0.36 (1.1)
Heavy	0.36 (0.9)	-0.72 (1.2)	-0.35 (2.8)	-0.42 (0.3)	-0.26 (0.6)
Any Drug Use					
Past 30 days	0.28 (0.4)	1.43 (0.7)	-1.16 (1.9)	0.18[b] (0.04)	0.44 (0.3)
Past 12 months	-0.01 (0.7)	1.66 (1.6)	-1.63 (1.4)	0.23 (0.1)	0.39 (0.6)
Cigarette Use, Past 30 Days					
Any smoking	0.39 (1.1)	3.21 (2.4)	-2.37 (1.4)	0.63 (0.3)	1.01 (0.8)
Heavy smoking	0.74 (0.8)	1.39 (2.3)	-1.09 (1.7)	-0.05 (0.2)	0.51 (0.7)
Alcohol Use Negative Effects					
Serious consequences	0.98 (0.4)	-0.69 (0.7)	-0.14 (1.4)	-0.08 (0.2)	0.06 (0.3)
Productivity loss	0.59 (0.5)	-3.07 (3.0)	-0.68 (2.5)	0.23 (0.3)	-0.76 (1.2)
Dependence	0.21 (0.5)	-0.07 (0.8)	-1.52 (2.6)	-0.21 (0.2)	-0.18 (0.4)
Drug Use Negative Effects					
Serious consequences	-0.44 (0.4)	0.17 (0.1)	0.08 (0.1)	-0.00+(0.0+)	-0.08 (0.1)
Productivity loss	-0.59 (0.5)	0.39 (0.2)	-2.74 (1.8)	0.01 (0.0+)	-0.35 (0.3)

Note: Entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol and drugs are reported for the past 12 months.

[a]Computed as the difference between the linearly and nonlinearly adjusted substance use measures.

[b]Individual differences between the linear and nonlinear estimates are significant at the 0.01 level.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

B.2.1 Estimate of Population Totals

Response variables, or observation variables, which are questionnaire items or quantities recoded from questionnaire items, are denoted by Y. The values obtained for the response variables are denoted by y.

A population total is estimated by the quantity,

$$\hat{Y} = \sum_{a=1}^{15} \sum_{i=1}^{n_1(a)} \sum_{b=1}^{6} \sum_{j=1}^{n_2(a,i,b)} w^*(a,i,b,j)\ y(a,i,b,j). \qquad (1)$$

For purposes of estimating the sampling variances, Equation (1) can be conveniently rewritten as a sum of the separate estimates for each of the sampled first-stage units. To this end, define:

$$\hat{Y}(a,i) = \sum_{b=1}^{6} \sum_{j=1}^{n_2(a,i,b)} w^*(a,i,b,j)\ y(a,i,b,j). \qquad (2)$$

Then Equation (1) can be rewritten as,

$$\hat{Y} = \sum_{a=1}^{15} \sum_{i=1}^{n_1(a)} \hat{Y}(a,i) \quad ,$$

and the sampling variance, assuming sampling with replacement at the first stage of the design, is estimated by:

$$\hat{\mathrm{Var}}\{\hat{Y}\} = \sum_{a=1}^{15} \frac{n_1(a)}{n_1(a)-1} \sum_{i=1}^{n_1(a)} \left[\hat{Y}(a,i) - \hat{\bar{Y}}(a)\right]^2, \qquad (3)$$

where

$$\hat{\bar{Y}}(a) = \frac{1}{n_1(a)} \sum_{i=1}^{n_1(a)} \hat{Y}(a,i) \quad .$$

B.2.2 Estimates of Population Proportions

Estimates of population proportions take the form of (combined) ratio estimates, denoted in general by:

$$\hat{R} = \frac{\hat{Y}}{\hat{X}} \quad .$$

The numerator and denominator totals are individually estimated as described above. For example, $\hat{R}$ could be the mean ounces of ethanol consumed per person. Since the numerator and denominator quantities are random variables, the estimator is a nonlinear statistic. Ratio estimates are usually biased, but the bias becomes negligible in a large sample (see, for example, Cochran, 1977).

The variance of the estimator can be approximated using a Taylor series linearization. The linearized response variable value,

$$z(a,i,b,j) = y(a,i,b,j) - \hat{R}\, x(a,i,b,j) \qquad (4)$$

is computed and used in place of the y-values in Equation (2). The variance estimate is then computed as given in Equation (3).

B.2.3 Domain Estimates

Membership of a sample person in some specified subpopulation or domain of interest can be denoted by the indicator variable,

$\delta(a,i,b,j)$ = 1, if the j-th sample individual (in the b-th pay grade group, i-th first stage unit and a-th first stage stratum) is a member of the domain, and

= 0, otherwise.

Obviously, the products, $\delta(a,i,b,j)\, y(a,i,b,j)$, when substituted for the y-values alone in the previous formulas, restrict the calculations to the specified domain. Note that the ranges of summation in the formulas remain the same, namely over all of the individuals in the sample. This convention ensures that sampling variances are computed using the correct sample sizes.

Domain comparisons, taking the form of the difference or other linear combinations of domain estimates, have, in general, a covariance arising from the two-stage selection of the sample. This is, using a difference between two domains by way of example:

$$\text{Var}\{\hat{\theta}_1-\hat{\theta}_2\} = \text{Var}\{\hat{\theta}_1\} + \text{Var}\{\hat{\theta}_2\} - 2\,\text{Cov}\{\theta_1,\theta_2\}\ ,$$

where $\hat{\theta}_1$ and $\hat{\theta}_2$ denote the two domain estimates. In terms of the previous formulas, the first-stage level differences,

$$\hat{D}(a,i) = \hat{Y}_1(a,i) - \hat{Y}_2(a,i) \quad , \qquad i = 1,2,\ldots, n_1(a),$$

$$a = 1,2,\ldots, 15,$$

and their corresponding means,

$$\hat{\bar{D}}(a) = \frac{1}{n_1(a)} \sum_{i=1}^{n_1(a)} \hat{D}(a,i),$$

can be computed and used in Equation (3) to estimate the variance of the difference. Except as the necessary distributional assumptions may not apply, the quasi student's t statistic,

$$t^* = \frac{\hat{\theta}_1-\hat{\theta}_2}{[\text{Var}\{\hat{\theta}_1-\hat{\theta}_2\}]^{1/2}}$$

could be used with 48 degrees of freedom as an indicator of the statistical significance of the difference. The total degrees of freedom suggested is the number of first-stage units minus the number of first-stage strata.

The majority of the estimates of the standard errors presented in the report were calculated using the SUDAAN analysis software (discussed in section B.3), which uses the formulas (3) and (4), with the exception of estimates where the analysis domains were first-stage sampling strata or some subset (e.g., region of the world within Service or paygrade within region and Service). In these situations, the standard error we present is the maximum of the simple random sampling standard error or the estimate obtained using equations (3) and (4), because some of the first-stage strata had only a small number of FSUs on which to base the variance estimate.

B.3 Analysis Software

For producing the estimates, we used the SUDAAN (RTI SUrvey DAta ANalysis) software package, which has been developed at RTI for the specific purpose of analyzing data from complex surveys (RTI, 1991). RTI developed this software because most of the popular statistical software packages (e.g., SAS, SPSS, BMDP) do not contain procedures for properly estimating the variance of survey statistics (e.g., means, ratios, totals,

proportions, regression coefficients) obtained from a complex sample survey such as the Worldwide Survey. The analytical procedures in these packages assume that the data come from simple random samples. Many software packages have no mechanism for dealing with sample design factors and either do not allow the use of sampling weights or use them in an unreliable or inconsistent fashion.

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 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 RATIO procedure generalizes the capacities of DESCRIPT to general ratio estimates and their standard errors. The CROSSTAB procedure produces weighted frequencies, percentages, and estimates of their standard errors for specified domains.

Regression coefficients are also nonlinear statistics in a sample survey context. We estimated the linear regression models using REGRESS, a regression procedure within the SUDAAN package designed to appropriately estimate coefficients and their standard errors using data from a complex sample design. For fitting the logistic regression models, we 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 REGRESS and LOGISTIC were based on a Hotelling's T^2-type statistic, which is assumed to have a transformed F-distribution in repeated samples (Shah, Holt, & Folsom, 1977). These regression procedures allow for saving a data set containing the estimated coefficients and variance-covariance matrix, which we then used for producing adjusted means and predicted values.

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APPENDIX C

ESTIMATED SAMPLING ERRORS

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ESTIMATED SAMPLING ERRORS

We have included the procedures and methodology we describe here to help the reader use the estimates of sampling errors that we have 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, we observed only a sample, rather than every member of the population. There are over 2 million officers and enlisted personnel in the 4 military services on active duty worldwide. Samples of 16,400 such military personnel clustered in 64 central installations can provide close, but less than perfect, estimates of the responses that we would have obtained had we asked all officers and enlisted personnel to complete the survey of substance abuse and health behaviors.

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"--ranges that are very likely to include the true population value. For example, Table 3.1 shows that 20.4% of the military personnel in the 1992 sample reported having consumed no beverage alcohol in the past 30 days with a standard error of 0.8%. 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), and then 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 18.8% and 22.0%. A somewhat wider set of limits can be set up to indicate the 99% confidence interval.

It is also possible to construct a confidence interval for a difference between two estimated percentages. For example, we have estimated the difference between 1988 and 1992 in the percentages of all military personnel whom we classified as abstainers as 3.2% (Table 3.1), and we have computed the 95% confidence limits for that difference as $\pm$1.6% of that estimate. In other words, we can be 95% certain that the true difference between the 2 years' populations is somewhere between 1.6% below the estimated difference and 1.6% above it. Since that range does not include zero difference between the 2 years, at the 95% level the estimated difference is significantly different from zero,

or just "significant." If the interval had been larger, say 4.0%, the difference would have been "not significant" at the 95% level.

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 we used in this survey, other factors also determine confidence limits. In this section we discuss all of the factors, beginning with the basic ones and proceeding to those that are more complex.

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, *ceteris paribus*, have a confidence interval just half as wide as that for a sample of 100, since $1/\sqrt{400}$ 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 100.0) is also 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% since $\sqrt{.1 \times .9}$ is $3/5 \times \sqrt{.5 \times .5}$.

C.3 Design Effects in Complex Samples

Under simple random sampling (SRS), a confidence interval can be determined from the two factors we 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 effects of clustering and weighting reduce it, and the result is usually lower precision than would be obtained by the use of a simple random sample of the same size. Accordingly, using the simple formula generally underestimates the sampling error involved.

There are methods to correct for this underestimation, however. Kish (1965, p. 258) has defined a correction term known as the design effect (DEFF), where

$$\text{DEFF} = \frac{\text{actual sampling variance}}{\text{SRS variance}}.$$

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, we have computed standard errors for estimated proportions. We incorporated into our calculations the appropriate (sub)sample sizes, proportions, and correction for design effects.

C.4 Suppression Rule for Estimates

In this report, we suppressed unreliable estimates. That is, we suppressed proportions and means that could not be reported with confidence because they were based on small sample sizes or had large sampling errors. The sample size restriction we used was to suppress an estimate when the number of observations on which it was based was fewer than 30 cases. We used two rules to suppress estimates with large sampling errors, one for means and one for proportions.

For estimates that were expressed as means (e.g., average ounces of ethanol or mean number of hospital visits), we also suppressed estimates with relative standard

errors (RSEs) greater than 50% of the estimate. The RSE is computed by dividing the standard error of the estimate by the estimate.

For estimates that were expressed as proportions (e.g., the proportion of heavy drinkers), we used a suppression rule based on the RSE of the natural log of the estimated proportion (p). Specifically, we suppressed estimates in tables and figures when

RSE [-ln(p)] > 0.225 for $p \leq 0.5$, and

RSE [-ln(1-p)] > 0.225 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.

We chose to use this rule 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 vary 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, were also suppressed and are shown as two asterisks (**) in the tables and figures.

Reference for Appendix C

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APPENDIX D

SUPPLEMENTAL TABLES

Table D.1 Substance Use and Health Summary for Army, 1980-1992

Measure	Year of Survey									
	1980		1982		1985		1988		1992	
Alcohol Drinking Levels										
Abstainer	15.5	(0.7)	11.7	(0.5)[b]	14.9	(0.7)[b]	17.1	(0.7)[b]	21.8	(1.4)[b,c]
Infrequent/light	12.2	(0.9)	16.7	(1.0)[b]	16.6	(1.1)	16.8	(0.9)	17.6	(0.5)[c]
Moderate	19.9	(1.2)	16.6	(0.8)[b]	17.6	(0.7)	19.5	(0.8)	17.2	(0.8)[b]
Moderate/heavy	32.0	(0.7)	30.3	(1.0)	25.6	(1.8)[b]	27.1	(0.8)	26.2	(1.4)[c]
Heavy	20.3	(1.6)	24.7	(1.4)[b]	25.2	(2.2)	19.5	(1.1)[b]	17.2	(1.5)
Any Drug Use*										
Past 30 days	30.7	(2.8)	26.2	(1.8)	11.5	(1.3)[b]	6.9	(0.7)[b]	3.9	(0.8)[b,c]
Past 12 months	39.4	(2.9)	32.4	(1.8)[b]	16.6	(1.3)[b]	11.8	(1.1)[b]	7.7	(0.8)[b,c]
Cigarette Use, Past 30 Days										
Any smoking	54.3	(0.7)	54.7	(1.8)	52.0	(1.8)	43.1	(1.1)[b]	37.0	(2.0)[b,c]
Heavy smoking	35.2	(0.7)	34.6	(1.4)	33.6	(1.4)	22.8	(0.7)[b]	18.0	(1.1)[b,c]
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)[c]
Productivity loss	23.8	(1.3)	33.1	(0.8)[b]	27.2	(1.3)[b]	22.0	(1.0)[b]	14.8	(1.4)[b,c]
Dependence	8.8	(1.0)	10.1	(0.8)	12.1	(1.5)	7.2	(0.6)[b]	5.4	(0.7)[c]
Drug Use Negative Effects										
Serious consequences	14.4	(1.4)	8.0	(0.7)[b]	3.9	(0.7)[b]	2.7	(0.4)	0.9	(0.3)[b,c]
Productivity loss	15.7	(1.7)	13.1	(1.2)	4.4	(0.8)	2.4	(0.4)[b]	0.9	(0.3)[b,c]
Health Practices, Past 12 Months	-	(-)	-	(-)	3.82	(0.04)	3.99	(0.02)[b]	3.86	(0.05)[b]

Note: Entries for health practices are mean values. Other entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol and drugs are reported for the past 12 months.

*Any nonmedical use of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs are also included for 1988 and 1992.

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

- Data are not available before 1985.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.2 Substance Use and Health Summary for Navy, 1980-1992

Measure	Year of Survey									
	1980		1982		1985		1988		1992	
Alcohol Drinking Levels										
Abstainer	10.0	(0.5)	10.5	(1.4)	9.6	(0.8)	15.7	(0.6)[b]	20.2	(2.2)[c]
Infrequent/light	11.7	(0.6)	20.7	(2.3)[b]	18.8	(2.0)	18.3	(0.9)	19.0	(1.1)[c]
Moderate	20.5	(1.3)	15.1	(1.1)[b]	18.7	(1.1)[b]	20.9	(1.2)	20.2	(1.1)
Moderate/heavy	32.2	(1.6)	26.1	(1.5)[b]	27.9	(1.4)	30.5	(1.6)	26.9	(0.7)[b,c]
Heavy	25.6	(2.3)	27.7	(2.9)	24.9	(1.4)	14.6	(2.1)[b]	13.8	(1.4)[c]
Any Drug Use*										
Past 30 days	33.7	(2.1)	16.2	(2.2)[b]	10.3	(1.7)[b]	5.4	(0.7)[b]	4.0	(0.9)[c]
Past 12 months	43.2	(2.1)	28.1	(1.7)[b]	15.9	(2.3)[b]	11.3	(2.1)	6.6	(1.9)[c]
Cigarette Use, Past 30 Days										
Any smoking	53.8	(1.2)	55.4	(1.0)	47.9	(1.2)[b]	43.8	(1.8)	37.1	(1.7)[b,c]
Heavy smoking	37.3	(1.3)	35.7	(1.4)	34.8	(1.6)	24.6	(2.0)[b]	20.4	(0.5)[b,c]
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)[c]
Productivity loss	34.7	(2.1)	41.8	(1.8)[b]	35.5	(2.4)[b]	26.4	(3.1)[b]	20.1	(4.1)[c]
Dependence	9.7	(1.0)	11.6	(1.0)	6.8	(0.8)[b]	7.2	(1.3)	5.2	(1.0)[c]
Drug Use Negative Effects										
Serious consequences	17.2	(2.1)	7.4	(0.9)[b]	4.0	(1.0)[b]	2.4	(0.5)	0.4	(0.2)[b,c]
Productivity loss	18.8	(2.0)	11.3	(0.9)[b]	3.9	(1.1)	3.1	(1.3)	0.9	(0.3)[c]
Health Practices, Past 12 Months	-	(-)	-	(-)	3.57	(0.03)	3.76	(0.10)	3.64	(0.09)

Note: Entries for health practices are mean values. Other entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol and drugs are reported for the past 12 months.

*Any nonmedical use of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs are also included for 1988 and 1992.

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

- Data are not available before 1985.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.3 Substance Use and Health Summary for Marine Corps, 1980-1992

Measure	Year of Survey									
	1980		1982		1985		1988		1992	
Alcohol Drinking Levels										
Abstainer	10.4	(1.0)	13.5	(2.0)	10.8	(2.5)	18.0	(0.9)[b]	15.1	(0.7)[b,c]
Infrequent/light	11.0	(0.5)	13.2	(1.8)	13.6	(1.7)	15.9	(3.2)	15.2	(1.2)[c]
Moderate	17.6	(1.2)	14.9	(0.3)[b]	15.1	(2.1)	14.0	(1.1)	19.2	(1.4)[b]
Moderate/heavy	32.3	(1.4)	27.8	(0.7)	31.1	(1.8)	28.2	(1.7)	25.0	(1.8)[c]
Heavy	28.6	(2.5)	30.6	(0.9)	29.4	(3.7)	23.9	(3.9)	25.5	(1.2)
Any Drug Use*										
Past 30 days	37.7	(3.0)	20.6	(2.0)[b]	9.9	(3.2)[b]	4.0	(0.7)	5.6	(1.0)[c]
Past 12 months	48.0	(3.1)	29.9	(3.2)[b]	14.7	(3.8)[b]	7.8	(1.0)	10.7	(1.3)[c]
Cigarette Use, Past 30 Days										
Any smoking	53.4	(0.6)	48.7	(0.4)[b]	42.6	(3.1)	41.3	(1.8)	39.2	(2.3)[c]
Heavy smoking	34.5	(0.9)	31.6	(0.7)[b]	26.1	(0.8)[b]	18.7	(2.2)[b]	20.7	(1.8)[c]
Alcohol Use Negative Effects										
Serious consequences	26.2	(2.2)	19.7	(1.0)[b]	12.3	(1.7)[b]	17.0	(3.4)	14.8	(2.1)[c]
Productivity loss	34.1	(1.6)	37.6	(1.2)	29.0	(5.0)	32.0	(3.8)	25.6	(1.9)[c]
Dependence	11.8	(1.2)	10.2	(1.8)	7.6	(1.4)	9.8	(1.7)	11.2	(1.7)
Drug Use Negative Effects										
Serious consequences	19.4	(2.1)	7.2	(1.1)[b]	3.9	(2.2)	1.9	(0.5)	0.3	(0.3)[b,c]
Productivity loss	20.8	(2.1)	8.9	(0.8)[b]	4.3	(3.0)	3.0	(0.9)	1.4	(0.8)[c]
Health Practices, Past 12 Months	-	(-)	-	(-)	3.83	(0.09)	3.92	(0.06)	3.77	(0.02)[b]

Note: Entries for health practices are mean values. Other entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol and drugs are reported for the past 12 months.

*Any nonmedical use of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs are also included for 1988 and 1992.

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

- Data are not available before 1985.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.4 Substance Use and Health Summary for Air Force, 1980-1992

Measure	Year of Survey									
	1980		1982		1985		1988		1992	
Alcohol Drinking Levels										
Abstainer	15.0	(1.0)	12.6	(0.7)	15.8	(1.0)[b]	18.5	(0.8)[b]	21.3	(0.9)[b,c]
Infrequent/light	12.6	(0.5)	17.3	(0.8)[b]	15.4	(0.8)	18.2	(0.8)[b]	21.3	(0.9)[b,c]
Moderate	24.9	(1.2)	19.8	(0.7)[b]	20.8	(1.2)	19.7	(0.8)	21.3	(0.7)[c]
Moderate/heavy	33.2	(0.9)	32.6	(0.8)	31.5	(1.1)	29.2	(1.1)	25.5	(0.8)[b,c]
Heavy	14.3	(1.4)	17.7	(1.2)	16.4	(1.4)	14.5	(1.0)	10.7	(0.8)[b,c]
Any Drug Use*										
Past 30 days	14.5	(1.1)	11.9	(1.5)	4.5	(0.8)[b]	2.1	(0.4)[b]	1.2	(0.2)[b,c]
Past 12 months	23.4	(1.7)	16.4	(1.8)[b]	7.2	(0.9)[b]	3.8	(0.6)[b]	2.3	(0.3)[b,c]
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)[b,c]
Heavy smoking	29.7	(1.3)	30.6	(1.2)	26.8	(1.7)	22.0	(0.8)[b]	14.6	(1.0)[b,c]
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)[c]
Productivity loss	20.7	(1.2)	28.0	(2.7)[b]	19.4	(1.1)	15.5	(0.8)[b]	10.6	(0.5)[b,c]
Dependence	4.3	(0.6)	3.7	(0.7)	3.3	(0.5)	3.8	(0.4)	2.7	(0.3)[b,c]
Drug Use Negative Effects										
Serious consequences	6.1	(0.6)	2.2	(0.3)[b]	0.9	(0.2)	0.3	(0.1)[b]	**	(**)[b,c]
Productivity loss	6.4	(0.7)	4.5	(0.5)[b]	1.5	(0.7)[b]	0.4	(0.1)	0.1	(0.1)[b,c]
Health Practices, Past 12 Months	-	(-)	-	(-)	3.95	(0.06)	3.95	(0.03)	3.95	(0.04)

Note: Entries for health practices are mean values. Other entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol and drugs are reported for the past 12 months.

*Any nonmedical use of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs are also included for 1988 and 1992.

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

[c]Comparisons between 1980 and 1992 are statistically significant at the 95% confidence level.

- Data are not available before 1985.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.5 Drinking Levels by Sociodemographic Characteristics - Total DoD

Sociodemographic Characteristic	Drinking Level									
	Abstainer		Infrequent/ Light		Moderate		Moderate/ Heavy		Heavy	
Sex										
Male	18.8	(0.8)	17.1	(0.6)	19.6	(0.5)	27.4	(0.6)	17.1	(0.7)
Female	29.9	(1.4)	28.5	(1.1)	18.7	(1.4)	18.4	(1.8)	4.4	(0.7)
Race/Ethnicity										
White, non-Hispanic	17.9	(0.7)	18.4	(0.5)	20.1	(0.5)	27.1	(0.6)	16.5	(0.7)
Black, non-Hispanic	28.3	(1.8)	18.8	(1.2)	18.9	(1.4)	23.7	(1.3)	10.3	(0.9)
Hispanic	19.5	(1.5)	20.9	(1.7)	16.9	(1.9)	24.9	(1.7)	17.9	(1.7)
Other	24.0	(2.3)	21.1	(2.2)	17.8	(1.7)	23.3	(2.6)	13.7	(2.5)
Education										
Less than high school graduate	13.5	(5.6)	+	(+)	6.8	(3.2)	+	(+)	+	(+)
High school graduate or GED	20.2	(1.5)	15.8	(0.7)	17.2	(0.8)	24.4	(0.9)	22.4	(1.5)
Some college	20.8	(0.9)	21.1	(1.0)	19.4	(0.7)	25.5	(0.7)	13.2	(0.6)
College graduate or higher	20.1	(1.0)	19.9	(1.1)	24.5	(1.1)	30.8	(1.3)	4.7	(0.5)
Age										
20 and under	20.7	(2.3)	15.5	(1.3)	17.7	(1.9)	21.7	(2.5)	24.5	(3.0)
21-25	16.5	(1.7)	16.9	(1.0)	18.3	(0.8)	25.9	(1.3)	22.5	(1.5)
26-34	20.0	(0.7)	20.9	(0.9)	19.8	(0.7)	27.0	(0.8)	12.3	(0.6)
35 and older	25.8	(1.0)	19.5	(0.8)	21.1	(0.9)	26.6	(1.0)	7.0	(0.5)
Family Status										
Not married	14.9	(1.1)	16.7	(0.9)	17.4	(0.8)	27.4	(1.2)	23.7	(1.8)
Married, spouse not present	19.5	(1.8)	21.0	(1.7)	16.2	(1.4)	27.6	(3.3)	15.8	(2.0)
Married, spouse present	24.2	(0.9)	20.0	(0.5)	21.2	(0.5)	25.0	(0.8)	9.5	(0.5)
Pay Grade										
E1-E3	16.3	(2.3)	16.7	(1.4)	17.4	(1.2)	21.4	(1.2)	28.2	(2.2)
E4-E6	21.4	(0.7)	19.1	(0.6)	18.5	(0.5)	25.8	(0.7)	15.2	(0.6)
E7-E9	25.9	(0.8)	19.5	(0.6)	18.7	(0.7)	26.9	(0.8)	9.0	(0.5)
W1-W4	22.7	(2.2)	18.1	(3.1)	23.1	(3.2)	26.0	(2.1)	10.1	(1.3)
O1-O3	18.4	(1.6)	21.1	(1.3)	24.1	(1.4)	30.9	(1.8)	5.5	(0.8)
O4-O10	16.9	(1.5)	17.8	(1.7)	28.8	(1.9)	34.1	(1.2)	2.5	(0.7)
Region										
Americas	21.5	(1.0)	19.2	(0.6)	19.8	(0.6)	24.8	(0.6)	14.7	(0.8)
North Pacific	15.8	(1.1)	15.2	(0.8)	16.3	(2.0)	33.2	(4.0)	19.5	(2.3)
Other Pacific	18.7	(0.9)	18.8	(2.0)	22.0	(1.3)	24.6	(1.0)	15.9	(2.1)
Europe	16.3	(1.6)	17.8	(0.7)	18.2	(0.9)	31.5	(1.5)	16.2	(2.0)
Total	20.4	(0.8)	18.8	(0.5)	19.5	(0.5)	26.1	(0.6)	15.2	(0.7)

Note: Table values are row percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

+Unreliable estimate.

Table D.6 Drinking Levels by Sociodemographic Characteristics - Army

Sociodemographic Characteristic	Drinking Level									
	Abstainer		Infrequent/ Light		Moderate		Moderate/ Heavy		Heavy	
Sex										
Male	19.4	(1.3)	16.4	(0.6)	17.1	(0.7)	27.8	(1.4)	19.3	(1.5)
Female	36.8	(2.7)	25.0	(1.9)	18.2	(2.2)	16.1	(2.6)	4.0	(1.2)
Race/Ethnicity										
White, non-Hispanic	19.0	(1.2)	17.0	(0.6)	17.1	(0.9)	27.9	(1.5)	19.0	(1.7)
Black, non-Hispanic	28.7	(2.1)	17.3	(1.4)	17.9	(1.5)	23.4	(2.4)	12.8	(1.6)
Hispanic	18.5	(2.1)	20.0	(2.7)	17.6	(2.6)	24.5	(3.1)	19.4	(2.9)
Other	22.5	(4.1)	21.5	(3.5)	14.7	(3.1)	24.6	(4.1)	16.7	(3.2)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	21.2	(1.9)	15.4	(1.1)	12.9	(1.0)	25.0	(2.1)	25.5	(2.2)
Some college	22.8	(1.7)	18.4	(1.2)	18.7	(0.9)	25.1	(1.7)	15.0	(1.5)
College graduate or higher	21.0	(1.5)	20.4	(1.4)	22.8	(2.2)	30.8	(2.0)	5.1	(0.6)
Age										
20 and under	22.8	(3.7)	12.3	(2.2)	12.5	(2.4)	20.2	(3.9)	32.1	(4.3)
21-25	17.5	(2.5)	16.8	(1.1)	16.1	(1.3)	25.7	(2.0)	24.0	(2.1)
26-34	20.9	(1.2)	18.5	(1.0)	18.8	(1.1)	27.6	(1.9)	14.2	(1.3)
35 and older	27.5	(1.4)	19.2	(1.1)	18.2	(1.4)	27.0	(1.7)	8.0	(0.9)
Family Status										
Not married	17.3	(2.4)	15.0	(1.3)	14.9	(1.4)	24.8	(2.6)	28.1	(2.9)
Married, spouse not present	20.5	(3.5)	18.1	(2.4)	13.6	(2.5)	32.6	(4.9)	15.1	(2.7)
Married, spouse present	24.5	(1.4)	19.1	(0.5)	19.0	(0.7)	26.2	(1.2)	11.2	(0.8)
Pay Grade										
E1-E3	14.6	(3.2)	13.8	(2.3)	12.1	(1.7)	24.4	(3.7)	35.0	(4.1)
E4-E6	22.6	(1.6)	17.9	(0.9)	16.4	(0.8)	24.9	(1.6)	18.2	(1.4)
E7-E9	28.6	(1.3)	18.3	(1.0)	17.5	(1.3)	25.2	(1.1)	10.4	(0.7)
W1-W4	22.2	(2.7)	18.7	(4.0)	24.5	(4.0)	25.8	(2.7)	8.8	(1.5)
O1-O3	19.6	(2.6)	19.1	(2.1)	23.6	(3.1)	32.2	(3.2)	5.4	(1.3)
O4-O10	20.0	(2.7)	19.3	(1.5)	22.6	(2.9)	34.4	(1.9)	3.7	(1.3)
Region										
Americas	24.0	(1.8)	18.2	(0.7)	17.8	(0.8)	23.5	(1.5)	16.4	(1.8)
North Pacific	13.9	(1.1)	17.4	(2.4)	10.5	(2.2)	44.1	(5.2)	14.1	(2.2)
Other Pacific	18.7	(0.3)	17.3	(1.5)	15.4	(1.5)	24.5	(2.4)	24.1	(5.1)
Europe	17.1	(2.3)	15.8	(1.1)	17.3	(1.4)	30.5	(1.8)	19.4	(3.1)
Total	21.8	(1.4)	17.6	(0.5)	17.2	(0.8)	26.2	(1.4)	17.2	(1.5)

Note: Table values are row percentages (with standard errors in parentheses).

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.7 Drinking Levels by Sociodemographic Characteristics - Navy

Sociodemographic Characteristic	Drinking Level									
	Abstainer		Infrequent/ Light		Moderate		Moderate/ Heavy		Heavy	
Sex										
Male	18.5	(2.1)	16.0	(1.4)	21.0	(1.1)	28.4	(0.9)	16.1	(1.4)
Female	26.7	(2.7)	31.2	(2.0)	16.8	(2.3)	20.7	(3.1)	4.6	(1.3)
Race/Ethnicity										
White, non-Hispanic	16.9	(1.6)	18.2	(0.9)	21.3	(0.9)	28.2	(0.7)	15.5	(1.2)
Black, non-Hispanic	30.5	(4.7)	21.4	(3.4)	18.6	(4.1)	23.5	(1.8)	6.0	(1.4)
Hispanic	18.7	(3.2)	24.3	(3.9)	15.5	(4.7)	24.8	(3.0)	16.8	(4.0)
Other	27.5	(4.0)	15.9	(3.4)	18.2	(3.2)	23.9	(5.1)	14.4	(5.2)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	22.3	(3.2)	15.8	(1.5)	18.9	(1.8)	24.5	(1.5)	18.4	(3.2)
Some college	19.1	(2.2)	22.6	(2.7)	19.8	(1.5)	27.0	(1.0)	11.6	(1.0)
College graduate or higher	17.0	(2.5)	18.9	(2.2)	25.1	(2.4)	33.2	(2.5)	5.9	(1.1)
Age										
20 and under	23.0	(5.0)	16.3	(1.7)	19.5	(4.3)	23.2	(5.2)	18.1	(6.8)
21-25	17.8	(4.3)	16.7	(1.6)	19.0	(1.7)	27.5	(2.7)	19.0	(2.3)
26-34	17.3	(1.1)	21.3	(1.8)	20.6	(1.3)	28.5	(1.2)	12.4	(0.8)
35 and older	27.3	(2.1)	20.1	(2.0)	21.6	(1.0)	25.0	(1.6)	6.1	(0.7)
Family Status										
Not married	14.5	(2.2)	18.3	(1.8)	18.3	(1.6)	30.0	(2.2)	18.9	(3.6)
Married, spouse not present	21.1	(3.2)	23.7	(3.9)	19.3	(2.0)	20.2	(6.8)	15.6	(5.1)
Married, spouse present	24.9	(2.6)	19.0	(1.1)	21.9	(1.0)	25.0	(2.1)	9.2	(0.9)
Pay Grade										
E1-E3	18.7	(6.3)	18.5	(2.1)	17.1	(2.3)	20.9	(2.0)	24.9	(4.8)
E4-E6	21.5	(1.3)	19.1	(1.3)	19.7	(1.1)	27.4	(1.2)	12.3	(0.8)
E7-E9	23.7	(0.9)	19.4	(1.3)	20.2	(1.4)	27.3	(1.6)	9.4	(0.9)
W1-W4	22.8	(4.9)	16.8	(5.9)	18.6	(4.9)	25.6	(3.6)	16.2	(4.6)
O1-O3	12.8	(2.7)	21.6	(3.3)	25.0	(3.2)	33.5	(3.4)	7.1	(1.5)
O4-O10	12.5	(2.0)	15.8	(1.7)	33.9	(2.3)	35.3	(2.2)	2.5	(1.1)
Region										
Americas	20.5	(2.5)	19.3	(1.2)	19.7	(1.3)	26.8	(0.9)	13.8	(1.6)
North Pacific	20.2	(1.6)	14.0	(1.4)	20.6	(1.6)	26.6	(1.8)	18.7	(2.7)
Other Pacific	19.0	(1.6)	20.6	(4.0)	26.9	(3.0)	23.9	(1.7)	9.5	(1.2)
Europe	14.3	(1.7)	13.2	(1.4)	20.5	(1.7)	34.5	(2.3)	17.5	(3.9)
Total	20.2	(2.2)	19.0	(1.1)	20.2	(1.1)	26.9	(0.7)	13.8	(1.4)

Note: Table values are row percentages (with standard errors in parentheses).

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.8 Drinking Levels by Sociodemographic Characteristics - Marine Corps

Sociodemographic Characteristic	Drinking Level									
	Abstainer		Infrequent/ Light		Moderate		Moderate/ Heavy		Heavy	
Sex										
Male	15.1	(0.7)	14.5	(1.1)	19.0	(1.2)	25.3	(2.0)	26.1	(1.3)
Female	16.0	(4.4)	32.9	(6.8)	+	(+)	17.7	(5.3)	10.0	(4.3)
Race/Ethnicity										
White, non-Hispanic	12.3	(0.7)	14.1	(1.1)	19.9	(1.4)	25.6	(1.6)	28.1	(1.3)
Black, non-Hispanic	22.5	(1.5)	17.8	(2.8)	21.6	(2.8)	22.0	(4.2)	16.1	(1.8)
Hispanic	19.5	(4.2)	14.1	(4.3)	10.0	(2.4)	25.5	(3.1)	30.8	(5.5)
Other	19.0	(5.1)	24.8	(6.3)	14.7	(5.4)	29.0	(6.8)	12.5	(7.0)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	13.3	(1.5)	12.3	(0.8)	19.6	(1.7)	24.6	(1.3)	30.2	(0.9)
Some college	20.0	(1.6)	22.4	(4.0)	16.2	(1.4)	20.8	(2.5)	20.5	(2.5)
College graduate or higher	13.5	(1.5)	14.5	(2.1)	25.8	(2.8)	38.9	(2.5)	7.3	(2.3)
Age										
20 and under	6.4	(2.2)	17.8	(4.2)	19.6	(3.8)	24.9	(5.4)	31.3	(4.2)
21-25	12.4	(2.5)	12.2	(4.6)	17.3	(1.9)	22.1	(3.3)	36.0	(4.1)
26-34	22.0	(1.5)	17.2	(4.0)	18.1	(1.9)	26.4	(3.3)	16.3	(2.8)
35 and older	20.1	(4.1)	15.6	(0.9)	26.0	(4.2)	30.5	(3.2)	7.9	(0.8)
Family Status										
Not married	9.9	(1.7)	13.8	(2.0)	16.1	(2.1)	23.7	(0.7)	36.5	(1.7)
Married, spouse not present	17.7	(3.4)	20.9	(1.9)	12.9	(4.4)	26.6	(5.7)	21.9	(4.9)
Married, spouse present	20.9	(1.8)	15.7	(0.7)	24.2	(1.8)	26.3	(2.7)	12.9	(0.7)
Pay Grade										
E1-E3	11.4	(0.9)	15.5	(3.4)	18.2	(1.8)	20.1	(1.8)	34.9	(1.3)
E4-E6	17.4	(1.4)	14.5	(1.8)	18.0	(2.4)	25.8	(1.8)	24.2	(0.9)
E7-E9	26.3	(3.0)	18.6	(1.3)	20.5	(1.6)	25.9	(2.2)	8.7	(1.0)
W1-W4	26.6	(4.3)	15.7	(3.3)	18.7	(4.3)	28.2	(1.8)	10.8	(3.0)
O1-O3	9.6	(1.0)	13.5	(4.7)	20.5	(2.6)	45.2	(5.7)	11.3	(1.7)
O4-O10	11.2	(5.2)	14.5	(1.7)	40.9	(6.0)	32.6	(1.3)	0.9	(0.7)
Region										
Americas	14.8	(1.1)	15.4	(1.5)	19.6	(1.7)	25.0	(2.2)	25.2	(1.4)
North Pacific	16.9	(3.3)	15.8	(1.6)	17.6	(1.6)	25.5	(2.2)	24.2	(3.0)
Other Pacific	16.6	(4.7)	12.6	(2.3)	19.0	(3.0)	25.0	(4.0)	26.8	(6.0)
Europe	8.5	(3.8)	9.7	(2.6)	12.9	(2.9)	24.7	(5.1)	44.3	(7.1)
Total	15.1	(0.7)	15.2	(1.2)	19.2	(1.4)	25.0	(1.8)	25.5	(1.2)

Note: Table values are row percentages (with standard errors in parentheses).

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.9 Drinking Levels by Sociodemographic Characteristics - Air Force

Sociodemographic Characteristic	Drinking Level									
	Abstainer		Infrequent/ Light		Moderate		Moderate/ Heavy		Heavy	
Sex										
Male	19.9	(0.7)	20.1	(1.2)	21.2	(0.9)	27.0	(0.8)	11.9	(0.9)
Female	29.0	(2.3)	27.9	(1.6)	21.5	(1.6)	17.5	(1.9)	4.1	(1.0)
Race/Ethnicity										
White, non-Hispanic	20.0	(0.9)	21.3	(0.9)	21.5	(0.8)	25.9	(0.9)	11.3	(1.0)
Black, non-Hispanic	27.7	(3.6)	18.8	(1.2)	20.2	(1.6)	25.5	(2.4)	7.8	(1.3)
Hispanic	22.0	(3.2)	21.9	(3.5)	20.1	(4.1)	25.3	(3.3)	10.8	(2.1)
Other	21.2	(4.0)	29.4	(5.5)	22.7	(2.9)	18.3	(2.8)	8.4	(2.5)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	21.4	(1.6)	20.3	(1.0)	18.7	(1.8)	22.5	(1.6)	17.1	(1.1)
Some college	20.6	(1.0)	21.9	(1.3)	20.3	(1.2)	25.6	(1.1)	11.5	(0.8)
College graduate or higher	22.5	(1.5)	20.9	(2.1)	25.4	(1.4)	28.0	(2.6)	3.3	(0.8)
Age										
20 and under	29.9	(3.4)	17.0	(2.6)	22.2	(4.2)	17.6	(3.5)	13.3	(3.1)
21-25	15.7	(1.1)	19.9	(1.6)	20.7	(1.7)	26.3	(2.1)	17.4	(2.1)
26-34	21.2	(1.5)	23.6	(1.6)	20.5	(1.4)	25.3	(1.1)	9.4	(0.9)
35 and older	24.2	(1.6)	19.9	(1.6)	22.6	(1.7)	26.8	(1.9)	6.5	(1.0)
Family Status										
Not married	15.6	(1.5)	18.1	(1.2)	19.9	(1.1)	29.0	(1.3)	17.5	(1.4)
Married, spouse not present	16.5	(3.4)	22.0	(4.2)	18.8	(2.4)	29.8	(2.5)	13.0	(1.7)
Married, spouse present	24.2	(1.0)	22.7	(1.1)	22.1	(1.0)	23.6	(1.1)	7.4	(1.0)
Pay Grade										
E1-E3	20.0	(1.8)	18.4	(2.5)	23.0	(3.3)	20.4	(1.4)	18.2	(2.3)
E4-E6	21.1	(1.2)	21.8	(1.2)	19.6	(0.9)	24.9	(1.0)	12.5	(0.8)
E7-E9	25.0	(1.7)	21.1	(0.9)	18.0	(0.8)	28.8	(1.9)	7.0	(0.9)
W1-W4	*	(*)	*	(*)	*	(*)	*	(*)	*	(*)
O1-O3	22.4	(2.7)	23.9	(1.7)	24.8	(1.6)	25.5	(2.6)	3.5	(1.3)
O4-O10	17.4	(1.7)	18.2	(4.4)	29.5	(1.1)	33.3	(2.6)	1.5	(0.4)
Region										
Americas	22.6	(1.1)	21.5	(1.1)	21.7	(0.9)	23.8	(0.9)	10.4	(1.0)
North Pacific	13.4	(2.0)	12.6	(1.6)	18.9	(2.7)	33.5	(2.2)	21.6	(1.9)
Other Pacific	20.5	(1.6)	24.2	(1.7)	22.3	(1.7)	26.6	(2.3)	6.4	(1.0)
Europe	15.9	(2.5)	22.5	(1.7)	19.3	(1.6)	32.8	(3.1)	9.4	(1.2)
Total	21.3	(0.9)	21.3	(0.9)	21.3	(0.7)	25.5	(0.8)	10.7	(0.8)

Note: Table values are row percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.10 Heavy Alcohol Use, Past 30 Days, by Region and Pay Grade

Region/ Pay Grade	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Americas					
E1-E3	34.3 (5.3)	24.6 (5.3)	34.8 (4.8)	18.1 (2.6)	27.4 (2.6)
E4-E6	17.9 (1.5)	12.1 (1.1)	24.7 (2.4)	12.5 (1.0)	14.8 (0.7)
E7-E9	10.1 (0.8)	9.4 (1.1)	8.5 (1.2)	6.8 (1.1)	8.8 (0.5)
W1-W4	9.9 (1.8)	17.9 (5.3)	9.7 (2.4)	* (*)	11.1 (1.5)
O1-O3	4.5 (1.5)	7.3 (1.7)	11.9 (1.9)	3.0 (1.4)	5.1 (0.9)
O4-O10	3.8 (1.6)	2.9 (1.2)	+ (+)	1.6 (0.5)	2.6 (0.8)
Total	16.4 (1.8)	13.8 (1.6)	25.2 (1.4)	10.4 (1.0)	14.7 (0.8)
North Pacific					
E1-E3	+ (+)	26.3 (6.5)	32.2 (5.1)	+ (+)	30.7 (1.8)
E4-E6	9.2 (3.1)	20.1 (3.1)	19.4 (2.9)	23.7 (3.0)	17.1 (3.7)
E7-E9	16.8 (4.5)	8.3 (2.0)	8.8 (2.2)	+ (+)	13.9 (2.0)
W1-W4	+ (+)	+ (+)	+ (+)	* (*)	14 4 (4.2)
O1-O3	+ (+)	12.3 (1.9)	+ (+)	+ (+)	16.3 (2.7)
O4-O10	+ (+)	** (**)	** (**)	+ (+)	1.5 (0.9)
Total	14.1 (2.2)	18.7 (2.7)	24.2 (3.0)	21.6 (1.9)	19.5 (2.3)
Other Pacific					
E1-E3	+ (+)	21.0 (6.9)	34.4 (4.9)	+ (+)	30.2 (3.7)
E4-E6	25.9 (6.5)	8.5 (1.6)	26.3 (4.8)	8.8 (1.6)	15.2 (2.3)
E7-E9	12.6 (3.5)	9.7 (2.1)	11.5 (2.4)	+ (+)	10.0 (1.1)
W1-W4	4.3 (0.6)	+ (+)	3.9 (3.4)	* (*)	5.0 (2.4)
O1-O3	+ (+)	+ (+)	9.2 (4.3)	** (**)	4.6 (2.2)
O4-O10	+ (+)	** (**)	4.2 (2.5)	+ (+)	1.2 (0.6)
Total	24.1 (5.1)	9.5 (1.2)	26.8 (6.0)	6.4 (1.0)	15.9 (2.1)
Europe					
E1-E3	+ (+)	+ (+)	66.2 (5.7)	20.2 (7.0)	31.8 (6.9)
E4-E6	20.0 (2.4)	18.0 (2.1)	26.4 (4.8)	9.2 (1.8)	16.3 (1.7)
E7-E9	9.4 (1.5)	7.8 (2.2)	+ (+)	4.7 (1.6)	7.6 (0.7)
W1-W4	4.4 (2.4)	+ (+)	+ (+)	* (*)	4.5 (2.3)
O1-O3	7.3 (3.1)	+ (+)	+ (+)	+ (+)	4.8 (1.8)
O4-O10	3.6 (1.6)	** (**)	+ (+)	+ (+)	2.3 (0.8)
Total	19.4 (3.1)	17.5 (3.9)	44.3 (7.1)	9.4 (1.2)	16.2 (2.0)
Total DoD					
E1-E3	35.0 (4.1)	24.9 (4.8)	34.9 (1.3)	18.2 (2.3)	28.2 (2.2)
E4-E6	18.2 (1.4)	12.3 (0.8)	24.2 (0.9)	12.5 (0.8)	15.2 (0.6)
E7-E9	10.4 (0.7)	9.4 (0.9)	8.7 (1.0)	7.0 (0.9)	9.0 (0.5)
W1-W4	8.8 (1.5)	16.2 (4.6)	10.8 (3.0)	* (*)	10.1 (1.3)
O1-O3	5.4 (1.3)	7.1 (1.5)	11.3 (1.7)	3.5 (1.3)	5.5 (0.8)
O4-O10	3.7 (1.3)	2.5 (1.1)	0.9 (0.7)	1.5 (0.4)	2.5 (0.7)
Total	17.2 (1.5)	13.8 (1.4)	25.5 (1.2)	10.7 (0.8)	15.2 (0.7)

Note: Entries are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.11 Drinking Behavior Since Entering Military, by Time in Service

Service/Drinking Behavior	Years of Service: 0-3	4-9	10-19	20 or More	Total
Army					
Drink more now	33.1 (2.1)	21.9 (2.1)	20.1 (1.4)	18.8 (2.0)	25.0 (1.4)
Drink about the same	18.2 (1.7)	16.6 (2.0)	16.1 (1.1)	14.1 (1.7)	16.8 (0.9)
Drink less (but still drink)	29.8 (1.6)	38.3 (2.8)	39.2 (1.4)	40.8 (2.8)	35.8 (1.2)
Drank before, nondrinker at present	5.9 (1.3)	9.6 (1.2)	12.2 (1.0)	13.0 (1.4)	9.3 (0.7)
Nondrinker before and at present	13.0 (1.8)	13.6 (1.3)	12.4 (1.3)	13.2 (1.9)	13.1 (1.0)
Navy					
Drink more now	27.2 (2.9)	21.9 (1.7)	18.4 (1.3)	18.9 (2.3)	22.6 (1.6)
Drink about the same	22.0 (2.2)	18.6 (2.0)	14.2 (0.5)	15.1 (2.9)	18.4 (0.9)
Drink less (but still drink)	31.1 (5.0)	42.6 (1.3)	43.1 (1.7)	41.0 (2.1)	38.7 (2.5)
Drank before, nondrinker at present	6.1 (2.3)	7.6 (1.8)	15.5 (1.1)	15.5 (3.3)	9.5 (1.0)
Nondrinker before and at present	13.3 (3.0)	9.2 (1.0)	8.9 (1.2)	9.5 (1.1)	10.5 (1.6)
Marine Corps					
Drink more now	36.2 (2.4)	24.4 (1.9)	19.9 (1.7)	18.1 (1.9)	28.7 (1.0)
Drink about the same	20.0 (1.6)	16.3 (1.6)	14.7 (1.0)	18.1 (3.4)	17.7 (0.9)
Drink less (but still drink)	29.9 (2.8)	43.9 (1.3)	42.9 (2.0)	42.9 (5.1)	37.0 (1.0)
Drank before, nondrinker at present	7.0 (2.0)	8.9 (1.7)	11.9 (2.6)	14.3 (3.0)	9.0 (1.3)
Nondrinker before and at present	6.8 (1.4)	6.5 (0.9)	10.5 (1.6)	6.7 (2.3)	7.7 (1.0)
Air Force					
Drink more now	18.8 (1.9)	22.5 (2.3)	21.9 (1.0)	25.8 (1.7)	21.7 (0.9)
Drink about the same	21.9 (1.3)	16.3 (1.4)	14.7 (1.2)	17.3 (1.9)	17.0 (0.6)
Drink less (but still drink)	39.6 (1.9)	42.7 (1.3)	42.0 (1.5)	37.4 (2.4)	41.4 (0.9)
Drank before, nondrinker at present	5.8 (0.9)	10.6 (1.0)	11.1 (1.0)	10.2 (1.6)	9.7 (0.5)
Nondrinker before and at present	13.9 (0.8)	8.0 (0.9)	10.3 (0.8)	9.4 (1.9)	10.3 (0.4)
Total DoD					
Drink more now	28.9 (1.3)	22.3 (1.1)	20.3 (0.7)	21.3 (1.0)	23.7 (0.7)
Drink about the same	20.5 (0.9)	17.1 (1.0)	15.0 (0.6)	15.8 (1.1)	17.5 (0.5)
Drink less (but still drink)	32.2 (1.8)	41.5 (1.0)	41.5 (0.8)	39.8 (1.4)	38.4 (0.9)
Drank before, nondrinker at present	6.1 (0.9)	9.2 (0.8)	12.6 (0.6)	12.8 (1.2)	9.5 (0.4)
Nondrinker before and at present	12.3 (1.2)	9.9 (0.6)	10.6 (0.6)	10.3 (1.0)	10.9 (0.6)

Note: Entries are column percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.12 Any Drug Use (Excluding Steroids), Past 12 Months, by Sociodemographic Characteristics

Characteristic	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Sex										
Male	8.1	(0.9)	7.6	(2.2)	10.9	(1.5)	2.5	(0.3)	6.7	(0.7)
Female	5.6	(1.1)	3.0	(1.6)	+	(+)	1.5	(0.8)	3.4	(0.8)
Race/Ethnicity										
White, non-Hispanic	8.2	(1.0)	7.6	(2.3)	12.9	(1.8)	2.0	(0.4)	6.6	(0.8)
Black, non-Hispanic	6.2	(1.0)	1.7	(0.8)	6.1	(1.3)	2.5	(0.7)	4.2	(0.6)
Hispanic	8.6	(2.1)	12.7	(4.1)	+	(+)	5.9	(2.6)	8.9	(1.6)
Other	9.0	(2.7)	3.6	(1.9)	**	(**)	1.0	(0.8)	4.4	(1.2)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	10.6	(1.5)	8.5	(3.8)	12.5	(1.3)	3.5	(0.6)	9.0	(1.5)
Some college	7.3	(1.0)	6.3	(1.1)	9.9	(1.5)	2.5	(0.3)	5.5	(0.5)
College graduate or higher	2.8	(0.5)	2.3	(0.6)	0.9	(0.6)	1.0	(0.4)	1.9	(0.3)
Age										
20 and under	13.1	(3.1)	16.0	(6.0)	15.8	(3.3)	3.3	(1.2)	12.9	(2.2)
21-25	12.2	(1.6)	10.3	(4.2)	17.6	(1.9)	3.6	(0.6)	10.3	(1.6)
26-34	6.2	(0.8)	3.7	(1.1)	2.7	(0.8)	2.1	(0.4)	3.8	(0.4)
35 and older	2.8	(0.6)	1.5	(0.5)	1.8	(0.6)	1.4	(0.4)	1.9	(0.3)
Family Status										
Not married	11.7	(1.5)	10.6	(4.1)	14.3	(2.3)	3.9	(0.6)	9.9	(1.6)
Married, spouse not present	8.0	(2.7)	6.4	(3.2)	+	(+)	3.1	(1.5)	7.1	(1.7)
Married, spouse present	5.4	(0.6)	3.2	(0.7)	6.2	(2.2)	1.5	(0.2)	3.6	(0.3)
Pay Grade										
E1-E3	19.5	(3.7)	17.8	(6.4)	17.8	(2.0)	4.3	(1.5)	15.5	(2.4)
E4-E6	7.7	(0.7)	4.7	(0.6)	8.3	(2.1)	2.7	(0.2)	5.3	(0.4)
E7-E9	2.7	(0.5)	1.5	(0.5)	1.2	(0.5)	1.4	(0.2)	1.9	(0.2)
W1-W4	1.1	(0.8)	1.1	(0.8)	2.6	(1.2)	*	(*)	1.2	(0.6)
O1-O3	1.9	(0.8)	1.7	(0.9)	**	(**)	0.6	(0.4)	1.2	(0.3)
O4-O10	2.6	(0.6)	0.4	(0.3)	2.3	(1.3)	0.4	(0.3)	1.3	(0.4)
Region										
Americas	7.9	(1.1)	7.1	(2.2)	11.8	(1.6)	2.4	(0.4)	6.5	(0.8)
North Pacific	5.4	(+)	2.7	(0.7)	8.5	(1.6)	2.1	(0.7)	5.0	(1.1)
Other Pacific	12.0	(3.2)	4.2	(0.8)	4.4	(1.5)	1.7	(0.5)	6.0	(0.9)
Europe	7.0	(0.7)	3.1	(1.3)	3.9	(2.1)	1.9	(0.5)	4.9	(0.7)
Total	7.7	(0.8)	6.6	(1.9)	10.7	(1.3)	2.3	(0.3)	6.2	(0.6)

Note: Table values are percentages reporting any drug use in the past 12 months, excluding steriods (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.13 Any Drug Use (Excluding Steroids), Past 30 Days and Past 12 Months, by Pay Grade

Pay Grade/Period of Use	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
E1-E3					
Past 30 days	11.1 (3.9)	11.6 (4.0)	10.4 (2.0)	1.8 (0.8)	9.2 (1.7)
Past 12 months	19.5 (3.7)	17.8 (6.4)	17.8 (2.0)	4.3 (1.5)	15.5 (2.4)
E4-E6					
Past 30 days	3.7 (0.6)	2.5 (0.3)	3.2 (1.0)	1.5 (0.2)	2.7 (0.2)
Past 12 months	7.7 (0.7)	4.7 (0.6)	8.3 (2.1)	2.7 (0.2)	5.3 (0.4)
E7-E9					
Past 30 days	1.7 (0.4)	1.0 (0.5)	0.8 (0.3)	1.0 (0.2)	1.2 (0.2)
Past 12 months	2.7 (0.5)	1.5 (0.5)	1.2 (0.5)	1.4 (0.2)	1.9 (0.2)
W1-W4					
Past 30 days	1.1 (0.8)	1.1 (0.8)	0.9 (0.9)	* (*)	1.1 (0.6)
Past 12 months	1.1 (0.8)	1.1 (0.8)	2.6 (1.2)	* (*)	1.2 (0.6)
O1-O3					
Past 30 days	0.3 (0.3)	1.7 (0.9)	** (**)	0.3 (0.2)	0.6 (0.2)
Past 12 months	1.9 (0.8)	1.7 (0.9)	** (**)	0.6 (0.4)	1.2 (0.3)
O4-O10					
Past 30 days	0.8 (0.4)	0.3 (3.2)	2.3 (1.3)	0.1 (0.1)	0.5 (0.2)
Past 12 months	2.6 (0.6)	0.4 (0.3)	2.3 (1.3)	0.4 (0.3)	1.3 (0.4)
Total					
Past 30 days	3.9 (0.8)	4.0 (0.9)	5.6 (1.0)	1.2 (0.2)	3.4 (0.4)
Past 12 months	7.7 (0.8)	6.6 (1.9)	10.7 (1.3)	2.3 (0.3)	6.2 (0.6)

Note: Table values are percentages and represent prevalence estimates (with standard errors in parentheses). Any drug use refers to nonmedical use one or more times of marijuana, PCP, LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, "designer" drugs, or inhalants.

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.14 Any Drug Use (Excluding Steroids), Past 30 Days and Past 12 Months, by Enlisted Pay Grade

Pay Grade/ Time Period	Service									
	Army		Navy		Marine Corps		Air Force		Total DoD	
E1										
Past 30 days	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
Past 12 months	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
E2										
Past 30 days+	+	(+)	8.9	(4.8)	+	(+)	+	(+)	9.5	(3.3)
Past 12 months	+	(+)	+	(+)	13.2	(2.5)	5.0	(2.8)	13.5	(3.7)
E3										
Past 30 days	8.5	(2.8)	13.2	(4.3)	11.1	(2.4)	2.0	(1.0)	9.2	(1.6)
Past 12 months	16.1	(3.5)	+	(+)	18.3	(1.8)	4.3	(1.8)	15.7	(2.7)
E4										
Past 30 days	4.7	(1.2)	3.3	(0.8)	5.5	(2.1)	1.8	(0.5)	3.6	(0.5)
Past 12 months	10.0	(1.5)	6.3	(1.9)	14.2	(2.7)	3.3	(0.5)	7.5	(0.9)
E5										
Past 30 days	2.7	(0.6)	2.2	(0.7)	2.4	(1.2)	1.6	(0.2)	2.1	(0.3)
Past 12 months	6.2	(0.9)	3.7	(0.9)	5.4	(2.6)	2.5	(0.4)	4.1	(0.5)
E6										
Past 30 days	2.7	(0.9)	1.7	(0.6)	+	(+)	1.1	(0.5)	1.7	(0.4)
Past 12 months	4.5	(0.9)	3.8	(0.8)	1.9	(0.8)	1.8	(0.8)	3.3	(0.5)
E7										
Past 30 days	2.0	(0.5)	1.1	(0.6)	1.0	(0.5)	1.1	(0.3)	1.4	(0.3)
Past 12 months	3.3	(0.6)	1.8	(0.7)	1.5	(0.7)	1.7	(0.4)	2.3	(0.3)
E8										
Past 30 days	0.6	(0.4)	1.0	(0.6)	0.7	(0.7)	0.5	(0.5)	0.7	(0.3)
Past 12 months	0.8	(0.5)	1.3	(0.8)	0.7	(0.8)	0.6	(0.5)	0.9	(0.3)
E9										
Past 30 days	1.1	(1.1)	0.9	(0.8)	**	(**)	0.9	(0.9)	0.9	(0.5)
Past 12 months	1.1	(1.1)	0.9	(0.8)	**	(**)	0.9	(0.9)	0.9	(0.5)
Total Enlisted										
Past 30 days	4.6	(0.9)	4.4	(1.1)	6.2	(1.1)	1.5	(0.2)	3.9	(0.5)
Past 12 months	9.0	(0.9)	7.4	(2.1)	11.9	(1.3)	2.8	(0.3)	7.1	(0.8)

Note: Entries are percentages (with standard errors in parentheses).

**Estimate rounds to zero.

+Unreliable estiamte.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.15 Nonmedical Drug Use (Excluding Steroids), Past 30 Days and Past 12 Months, E1-E3s

Drug/Period of Use	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Marijuana					
Past 30 days	6.1 (2.4)	5.3 (1.8)	5.7 (1.4)	** (**)	4.5 (0.9)
Past 12 months	14.3 (3.3)	10.7 (3.9)	13.7 (1.2)	1.1 (0.6)	10.3 (1.6)
Cocaine					
Past 30 days	3.4 (1.9)	5.2 (2.7)	1.3 (0.7)	** (**)	2.8 (1.1)
Past 12 months	7.5 (2.3)	8.8 (4.0)	3.4 (1.3)	** (**)	5.5 (1.6)
PCP					
Past 30 days	** (**)	+ (+)	** (**)	** (**)	0.1 (0.1)
Past 12 months	1.1 (0.6)	2.1 (1.4)	1.2 (0.9)	0.4 (0.4)	1.3 (0.6)
LSD/Hallucinogens					
Past 30 days	2.9 (1.4)	6.1 (2.7)	4.8 (1.7)	** (**)	3.8 (1.1)
Past 12 months	6.7 (1.8)	9.2 (3.9)	8.9 (2.3)	0.4 (0.4)	6.8 (1.5)
Amphetamines/Stimulants					
Past 30 days	1.1 (0.8)	0.7 (0.6)	0.9 (0.7)	** (**)	0.7 (0.3)
Past 12 months	3.0 (1.6)	3.6 (1.4)	1.1 (0.7)	** (**)	2.2 (0.7)
Tranquilizers					
Past 30 days	2.2 (1.3)	** (**)	0.7 (0.7)	0.3 (0.3)	0.7 (0.4)
Past 12 months	3.3 (1.4)	1.0 (0.7)	1.4 (0.9)	1.1 (0.7)	1.6 (0.5)
Barbiturates/Sedatives					
Past 30 days	1.3 (0.8)	0.7 (0.5)	** (**)	** (**)	0.5 (0.3)
Past 12 months	2.5 (1.4)	1.2 (0.9)	0.6 (0.6)	** (**)	1.1 (0.5)
Heroin/Other Opiates					
Past 30 days	** (**)	+ (+)	** (**)	** (**)	0.1 (0.1)
Past 12 months	0.7 (0.6)	+ (+)	1.9 (1.4)	** (**)	0.7 (0.4)
Analgesics					
Past 30 days	2.5 (0.8)	3.5 (1.6)	2.7 (0.6)	1.2 (0.6)	2.6 (0.6)
Past 12 months	3.5 (1.0)	4.1 (1.6)	2.7 (0.6)	1.9 (1.1)	3.2 (0.6)
Inhalants					
Past 30 days	1.6 (0.8)	2.8 (1.4)	0.6 (0.6)	0.2 (0.2)	1.5 (0.6)
Past 12 months	2.5 (0.9)	3.3 (1.4)	0.6 (0.6)	0.2 (0.2)	1.8 (0.6)
"Designer" Drugs					
Past 30 days	0.5 (0.5)	2.2 (1.4)	1.2 (0.6)	** (**)	1.2 (0.6)
Past 12 months	1.2 (0.8)	3.0 (1.4)	1.8 (1.1)	** (**)	1.7 (0.6)
Any Drug[a]					
Past 30 days	11.1 (3.9)	11.6 (4.0)	10.4 (2.0)	1.8 (0.8)	9.2 (1.7)
Past 12 months	19.5 (3.7)	17.8 (6.4)	17.8 (2.0)	4.3 (1.5)	15.5 (2.4)
Any Drug Except Marijuana[b]					
Past 30 days	9.0 (3.4)	10.1 (4.0)	7.2 (1.9)	1.8 (0.8)	7.5 (1.7)
Past 12 months	14.2 (3.0)	15.9 (6.5)	12.0 (2.6)	3.7 (1.3)	12.1 (2.5)

Note: Table values are percentages and represent prevalence estimates (with standard errors in parentheses).

**Estimate rounds to zero.
+Unreliable estimate.

[a]Nonmedical use one or more times of any drug or class of drugs listed above in the table.
[b]Nonmedical use one or more times of any drug or class of drugs listed above in the table excluding marijuana.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.16 Any Drug Use (Excluding Steroids), Past 30 Days, by Region and Pay Grade

Region/ Pay Grade	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Americas										
E1-E3	+	(+)	12.3	(4.5)	12.3	(2.9)	1.7	(0.9)	10.2	(2.1)
E4-E6	3.9	(0.8)	2.6	(0.5)	3.7	(1.2)	1.7	(0.3)	2.8	(0.3)
E7-E9	1.6	(0.5)	1.1	(0.5)	0.8	(0.5)	1.2	(0.3)	1.3	(0.2)
W1-W4	1.1	(1.1)	+	(+)	+	(+)	*	(*)	1.1	(0.8)
O1-O3	0.4	(0.4)	2.0	(1.0)	**	(**)	0.3	(0.3)	0.7	(0.3)
O4-O10	0.6	(0.5)	0.4	(0.4)	2.8	(1.3)	+	(+)	0.5	(0.2)
Total	4.0	(1.1)	4.3	(1.1)	6.4	(1.2)	1.3	(0.2)	3.6	(0.5)
North Pacific										
E1-E3	+	(+)	+	(+)	6.2	(2.6)	+	(+)	4.4	(1.5)
E4-E6	1.2	(1.2)	2.8	(1.1)	0.6	(0.6)	0.8	(0.6)	1.3	(0.3)
E7-E9	1.7	(1.5)	0.5	(0.5)	1.2	(0.8)	**	(**)	1.0	(0.3)
W1-W4	+	(+)	+	(+)	**	(**)	*	(*)	**	(**)
O1-O3	+	(+)	**	(**)	**	(**)	**	(**)	**	(**)
O4-O10	2.8	(0.5)	**	(**)	**	(**)	**	(**)	0.9	(0.7)
Total	1.0	(0.6)	2.1	(0.6)	3.5	(1.0)	1.1	(0.5)	1.9	(0.6)
Other Pacific										
E1-E3	8.4	(4.6)	7.7	(4.3)	3.2	(1.8)	+	(+)	5.8	(0.9)
E4-E6	6.5	(3.1)	1.7	(0.8)	1.4	(0.7)	0.7	(0.7)	2.7	(0.8)
E7-E9	+	(+)	**	(**)	+	(+)	0.8	(0.7)	0.4	(0.3)
W1-W4	**	(**)	+	(+)	**	(**)	*	(*)	1.6	(1.5)
O1-O3	**	(**)	**	(**)	**	(**)	+	(+)	0.2	(0.2)
O4-O10	**	(**)	**	(**)	**	(**)	+	(+)	0.4	(0.4)
Total	5.2	(2.3)	2.1	(0.3)	1.9	(0.8)	1.1	(0.4)	2.8	(0.6)
Europe										
E1-E3	11.0	(4.2)	+	(+)	+	(+)	+	(+)	6.9	(2.3)
E4-E6	3.3	(0.8)	1.6	(1.2)	2.6	(1.7)	1.3	(0.8)	2.5	(0.5)
E7-E9	2.1	(0.8)	1.5	(1.2)	+	(+)	**	(**)	1.3	(0.4)
W1-W4	+	(+)	+	(+)	+	(+)	*	(*)	+	(+)
O1-O3	**	(**)	+	(+)	+	(+)	**	(**)	**	(**)
O4-O10	1.3	(1.0)	**	(**)	+	(+)	**	(**)	0.6	(0.6)
Total	4.0	(0.6)	1.7	(0.6)	1.6	(1.2)	1.0	(0.7)	2.8	(0.4)
Total DoD										
E1-E3	11.1	(3.9)	11.6	(4.0)	10.4	(2.0)	1.8	(0.8)	9.2	(1.7)
E4-E6	3.7	(0.6)	2.5	(0.3)	3.2	(1.0)	1.5	(0.3)	2.7	(0.2)
E7-E9	1.7	(0.4)	1.0	(0.5)	0.8	(0.3)	1.0	(0.2)	1.2	(0.2)
W1-W4	1.1	(0.8)	1.1	(0.8)	0.9	(0.9)	*	(*)	1.1	(0.6)
O1-O3	0.3	(0.3)	1.7	(0.9)	**	(**)	0.3	(0.2)	0.6	(0.2)
O4-O10	0.8	(0.4)	0.3	(0.3)	2.3	(1.3)	0.1	(0.1)	0.5	(0.2)
Total	3.9	(0.8)	4.0	(0.9)	5.6	(1.0)	1.2	(0.2)	3.4	(0.4)

Note: Entries are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.17 Any Drug Use (Excluding Steroids), Past 12 Months, by Region and Pay Grade

Region/ Pay Grade	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Americas					
E1-E3	22.2 (4.9)	+ (+)	20.3 (3.5)	4.7 (1.6)	16.8 (3.0)
E4-E6	7.7 (1.0)	5.0 (0.8)	9.2 (2.6)	2.8 (0.4)	5.4 (0.5)
E7-E9	2.9 (0.6)	1.6 (0.6)	1.1 (0.6)	1.7 (0.4)	2.0 (0.3)
W1-W4	1.1 (1.1)	+ (+)	+ (+)	* (*)	1.3 (0.8)
O1-O3	2.4 (1.1)	2.0 (1.2)	** (**)	0.7 (0.5)	1.4 (0.4)
O4-O10	2.7 (0.9)	0.4 (0.4)	2.8 (1.7)	0.5 (0.3)	1.3 (0.5)
Total	7.9 (1.1)	7.1 (2.2)	11.8 (1.6)	2.4 (0.4)	6.5 (0.8)
North Pacific					
E1-E3	+ (+)	+ (+)	12.3 (3.6)	+ (+)	8.1 (3.1)
E4-E6	7.8 (2.9)	3.7 (1.2)	5.9 (1.7)	2.2 (1.0)	5.1 (1.0)
E7-E9	1.7 (1.5)	0.5 (0.5)	2.0 (1.1)	0.7 (0.7)	1.3 (0.3)
W1-W4	+ (+)	+ (+)	** (**)	* (*)	** (**)
O1-O3	+ (+)	** (**)	** (**)	** (**)	** (**)
O4-O10	8.5 (4.5)	+ (+)	** (**)	** (**)	3.2 (2.0)
Total	5.4 (1.4)	2.7 (0.7)	8.5 (1.6)	2.1 (0.1)	5.0 (1.1)
Other Pacific					
E1-E3	28.0 (7.5)	20.5 (6.5)	8.1 (2.8)	+ (+)	16.4 (2.0)
E4-E6	12.6 (4.1)	2.3 (0.9)	2.9 (0.9)	1.4 (0.8)	4.8 (1.0)
E7-E9	+ (+)	1.1 (1.1)	+ (+)	2.0 (0.8)	1.2 (0.6)
W1-W4	** (**)	+ (+)	** (**)	* (*)	+ (+)
O1-O3	** (**)	** (**)	** (**)	+ (+)	0.2 (0.2)
O4-O10	** (**)	** (**)	** (**)	+ (+)	0.4 (0.4)
Total	12.0 (3.2)	4.2 (0.8)	4.4 (1.5)	1.7 (0.2)	6.0 (0.9)
Europe					
E1-E3	15.3 (5.2)	+ (+)	5.9 (2.5)	+ (+)	10.1 (4.0)
E4-E6	6.9 (1.2)	3.2 (1.8)	2.6 (1.6)	2.4 (0.9)	5.1 (0.5)
E7-E9	2.5 (0.9)	1.5 (1.2)	+ (+)	** (**)	1.5 (0.6)
W1-W4	+ (+)	+ (+)	+ (+)	* (*)	+ (+)
O1-O3	** (**)	+ (+)	+ (+)	** (**)	** (**)
O4-O10	1.3 (1.0)	** (**)	+ (+)	** (**)	0.7 (0.6)
Total	7.0 (0.7)	3.1 (1.3)	3.9 (2.1)	1.9 (0.5)	4.9 (0.7)
Total DoD					
E1-E3	19.5 (3.7)	17.8 (6.4)	17.8 (2.0)	4.3 (1.5)	15.5 (2.4)
E4-E6	7.7 (0.7)	4.7 (0.6)	8.3 (2.1)	2.7 (0.2)	5.3 (0.4)
E7-E9	2.7 (0.5)	1.5 (0.5)	1.2 (0.5)	1.4 (0.2)	1.9 (0.2)
W1-W4	1.1 (0.8)	1.1 (0.8)	2.6 (1.2)	* (*)	1.2 (0.6)
O1-O3	1.9 (0.8)	1.7 (0.9)	** (**)	0.6 (0.4)	1.2 (0.3)
O4-O10	2.6 (0.6)	0.4 (0.3)	2.3 (1.3)	0.4 (0.3)	1.3 (0.4)
Total	7.7 (0.8)	6.6 (1.9)	10.7 (1.3)	2.3 (0.3)	6.2 (0.6)

Note: Entries are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.18 Patterns of Cigarette Smoking, Past 30 Days

Smoking Level	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Didn't smoke	63.2 (2.0)	63.1 (1.6)	61.0 (2.2)	70.9 (1.4)	65.1 (0.9)
1/2 pack or less/ day (1-15 cig.)	18.8 (1.4)	16.5 (1.3)	18.3 (1.1)	14.5 (0.8)	16.9 (0.6)
About 1 pack/day (16-25 cig.)	10.5 (0.5)	11.9 (0.6)	12.9 (2.0)	9.0 (0.6)	10.7 (0.4)
About 1 1/2 packs/ day (26-35 cig.)	4.4 (0.4)	5.1 (0.4)	5.3 (0.9)	3.8 (0.3)	4.5 (0.2)
About 2 or more packs/day (>36 cig.)	3.1 (0.5)	3.4 (0.8)	2.6 (0.5)	1.8 (0.3)	2.8 (0.3)

Note: Entries are percentages (with standard errors in parentheses).

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.19 Cigarette Use During Past 30 Days, by Pay Grade

Pay Grade/ Smoking Measure	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
E1-E3										
Any smoking	49.0	(3.7)	43.7	(1.2)	44.1	(2.6)	35.7	(2.4)	43.4	(1.3)
Heavy smoking	22.0	(3.2)	19.9	(4.9)	21.8	(3.7)	13.6	(1.3)	19.6	(2.0)
E4-E6										
Any smoking	40.6	(1.8)	38.7	(2.0)	39.1	(3.1)	34.2	(1.3)	38.0	(1.0)
Heavy smoking	18.7	(1.4)	21.6	(1.3)	21.0	(2.7)	17.2	(1.0)	19.4	(0.7)
E7-E9										
Any smoking	40.5	(1.0)	41.2	(1.8)	46.4	(1.9)	31.0	(1.8)	38.4	(0.9)
Heavy smoking	27.8	(1.1)	30.1	(2.1)	29.7	(3.8)	20.8	(1.6)	26.6	(1.0)
W1-W4										
Any smoking	26.2	(2.3)	24.2	(5.4)	33.9	(2.9)	*	(*)	22.8	(1.9)
Heavy smoking	14.8	(3.0)	18.3	(4.4)	24.6	(3.9)	*	(*)	16.4	(2.4)
O1-O3										
Any smoking	12.3	(2.3)	15.4	(1.7)	15.3	(3.5)	8.7	(1.6)	11.8	(1.0)
Heavy smoking	2.8	(0.9)	5.0	(2.1)	6.6	(2.4)	3.4	(0.9)	3.8	(0.7)
O4-O10										
Any smoking	13.3	(1.6)	12.8	(1.2)	12.7	(2.9)	10.9	(0.7)	12.3	(0.8)
Heavy smoking	8.8	(1.9)	8.0	(1.2)	8.0	(3.1)	6.2	(0.8)	7.6	(0.9)
Total DoD										
Any smoking	37.0	(2.0)	37.1	(1.7)	39.2	(2.3)	29.2	(1.4)	35.0	(1.0)
Heavy smoking	18.0	(1.1)	20.4	(0.5)	20.7	(1.8)	14.6	(1.0)	18.0	(0.5)

Note: Estimates are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.20 Cigarette Use, Past 30 Days, by Sociodemographic Characteristics

Sociodemographic Characteristic	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Sex										
Male	38.2	(2.1)	37.6	(1.9)	38.9	(2.4)	29.6	(1.4)	35.7	(1.0)
Female	29.8	(3.4)	35.0	(2.6)	47.0	(7.4)	26.9	(3.7)	31.5	(2.0)
Race/Ethnicity										
White, non-Hispanic	39.5	(2.5)	40.6	(1.7)	43.6	(3.4)	30.5	(1.7)	37.4	(1.1)
Black, non-Hispanic	32.3	(2.3)	30.9	(4.3)	25.4	(3.8)	21.8	(2.1)	29.0	(1.7)
Hispanic	34.2	(2.9)	26.8	(6.4)	36.6	(3.1)	30.3	(2.6)	31.6	(2.2)
Other	41.1	(5.0)	29.4	(4.6)	33.6	(6.6)	28.0	(5.2)	32.9	(2.7)
Education										
Less than high school graduate	+	(+)	+	(+)	+	(+)	+	(+)	+	(+)
High school graduate or GED	46.1	(2.1)	44.7	(0.8)	43.9	(3.0)	39.5	(1.9)	44.2	(1.0)
Some college	37.8	(1.7)	35.6	(2.4)	37.8	(2.7)	33.1	(1.0)	35.5	(0.9)
College graduate or higher	16.7	(1.7)	17.0	(2.3)	14.9	(2.2)	12.0	(1.0)	14.9	(0.9)
Age										
20 and under	39.6	(3.9)	44.9	(4.3)	45.3	(3.7)	30.2	(2.3)	40.8	(2.1)
21-25	37.1	(2.4)	37.0	(1.9)	39.8	(3.7)	32.4	(2.5)	36.4	(1.3)
26-34	37.6	(2.4)	37.2	(3.0)	35.5	(3.7)	28.6	(1.2)	34.4	(1.3)
35 and older	35.1	(2.5)	33.4	(1.5)	36.8	(3.3)	27.1	(2.4)	32.0	(1.3)
Family Status										
Not married	39.5	(2.0)	38.7	(2.0)	38.3	(3.3)	33.2	(2.1)	37.6	(1.1)
Married, spouse not present	37.8	(6.1)	31.0	(4.5)	+	(+)	30.4	(2.8)	35.4	(3.0)
Married, spouse present	35.5	(2.3)	36.5	(2.6)	39.0	(4.4)	27.2	(1.4)	33.3	(1.2)
Pay Grade										
E1-E3	48.9	(3.7)	43.7	(1.2)	44.1	(2.6)	35.7	(2.4)	43.4	(1.3)
E4-E6	40.6	(1.8)	38.7	(2.0)	39.1	(3.1)	34.2	(1.3)	38.0	(1.0)
E7-E9	40.5	(1.0)	41.2	(1.8)	46.4	(1.9)	31.0	(1.8)	38.4	(0.9)
W1-W4	26.2	(2.3)	24.2	(5.4)	33.9	(2.9)	*	(*)	26.8	(1.9)
O1-O3	12.3	(2.2)	15.4	(1.7)	15.3	(3.5)	8.7	(1.6)	11.8	(1.0)
O4-O10	13.3	(1.6)	12.8	(1.2)	12.7	(2.9)	10.9	(0.7)	12.3	(0.8)
Region										
Americas	36.1	(2.6)	37.4	(1.9)	39.3	(2.8)	28.0	(1.5)	34.5	(1.2)
North Pacific	+	(+)	34.5	(1.9)	37.4	(2.1)	36.3	(3.2)	38.1	(3.6)
Other Pacific	41.9	(2.0)	34.5	(1.9)	42.8	(7.6)	25.0	(1.7)	36.7	(1.6)
Europe	38.1	(2.1)	37.1	(2.1)	32.7	(7.4)	34.0	(4.0)	36.6	(1.8)
Total	37.0	(2.0)	37.1	(1.7)	39.2	(2.3)	29.2	(1.4)	35.0	(1.0)

Note: Estimates are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.
+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.21 Any Cigarette Use, Past 30 Days, by Region and Pay Grade

Region/ Pay Grade	Service									
	Army		Navy		Marine Corps		Air Force		Total DoD	
Americas										
E1-E3	51.3	(4.5)	43.9	(4.2)	44.4	(4.3)	34.1	(3.2)	43.5	(1.5)
E4-E6	39.4	(2.5)	39.0	(2.4)	39.7	(3.8)	33.8	(1.4)	37.7	(1.2)
E7-E9	41.2	(1.7)	41.2	(2.1)	48.4	(2.8)	30.3	(2.0)	38.6	(1.0)
W1-W4	25.2	(3.4)	23.4	(6.4)	35.9	(5.4)	*	(*)	26.1	(2.4)
O1-O3	11.5	(2.6)	15.9	(3.1)	12.6	(3.9)	7.1	(1.8)	10.9	(1.1)
O4-O10	13.5	(1.9)	13.0	(2.3)	13.3	(3.6)	10.6	(1.4)	12.3	(0.9)
Total	36.1	(2.6)	37.4	(1.9)	39.3	(2.8)	28.0	(1.5)	34.5	(1.2)
North Pacific										
E1-E3	+	(+)	37.0	(7.1)	39.9	(5.3)	+	(+)	42.7	(3.7)
E4-E6	45.2	(5.4)	36.8	(3.0)	34.9	(3.5)	38.8	(4.1)	39.9	(2.1)
E7-E9	45.6	(5.9)	44.1	(3.6)	40.2	(5.3)	41.3	(4.1)	43.1	(1.3)
W1-W4	+	(+)	+	(+)	+	(+)	*	(*)	27.9	(5.4)
O1-O3	+	(+)	14.5	(5.6)	+	(+)	+	(+)	+	(+)
O4-O10	+	(+)	7.4	(3.7)	9.7	(4.1)	16.8	(6.2)	9.5	(2.4)
Total	+	(+)	34.5	(1.9)	37.4	(2.1)	36.3	(3.2)	38.1	(3.6)
Other Pacific										
E1-E3	+	(+)	39.5	(7.9)	+	(+)	32.3	(7.1)	48.3	(4.5)
E4-E6	45.4	(3.3)	35.7	(2.8)	39.2	(4.0)	26.3	(2.6)	37.5	(1.1)
E7-E9	40.6	(3.5)	41.4	(3.5)	37.0	(3.3)	26.6	(3.3)	38.3	(1.5)
W1-W4	+	(+)	+	(+)	+	(+)	*	(*)	27.7	(5.6)
O1-O3	19.2	(5.5)	+	(+)	20.1	(2.2)	+	(+)	13.8	(2.3)
O4-O10	11.5	(4.3)	15.3	(6.2)	10.8	(1.4)	21.7	(5.4)	15.3	(2.8)
Total	41.9	(2.0)	34.5	(1.9)	42.8	(7.6)	25.0	(1.7)	36.7	(1.6)
Europe										
E1-E3	+	(+)	+	(+)	36.8	(5.8)	42.5	(7.2)	41.0	(4.8)
E4-E6	42.2	(3.0)	38.5	(2.6)	36.5	(5.5)	35.8	(3.9)	39.7	(2.1)
E7-E9	36.3	(2.5)	39.3	(4.9)	+	(+)	32.3	(4.7)	35.0	(2.2)
W1-W4	29.1	(4.9)	+	(+)	+	(+)	*	(*)	28.9	(2.9)
O1-O3	17.7	(4.5)	+	(+)	+	(+)	22.6	(7.1)	19.1	(1.9)
O4-O10	14.3	(3.1)	10.4	(5.2)	+	(+)	9.8	(3.1)	12.2	(1.8)
Total	38.1	(2.1)	37.1	(2.1)	32.7	(7.4)	34.0	(4.0)	36.6	(1.8)
Total DoD										
E1-E3	48.9	(3.7)	43.7	(1.2)	44.1	(2.6)	35.7	(2.4)	43.4	(1.3)
E4-E6	40.6	(1.8)	38.7	(2.0)	39.1	(3.1)	34.2	(1.3)	38.0	(1.0)
E7-E9	40.5	(1.0)	41.2	(1.8)	46.4	(1.9)	31.0	(1.8)	38.4	(0.9)
W1-W4	26.2	(2.3)	24.2	(5.4)	33.9	(2.9)	*	(*)	26.8	(1.9)
O1-O3	12.3	(2.2)	15.4	(1.7)	15.3	(3.5)	8.7	(1.6)	11.8	(1.0)
O4-O10	13.3	(1.6)	12.8	(1.2)	12.7	(2.9)	10.9	(0.7)	12.3	(0.8)
Total	37.0	(2.0)	37.1	(1.7)	39.2	(2.3)	29.2	(1.4)	35.0	(1.0)

Note: Entries are percentages (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.22 Alcohol Use Negative Effects, Past 12 Months, by Service

	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Serious Consequences					
Received UCMJ punishment	2.3 (0.4)	1.5 (0.7)	3.3 (1.0)	1.1 (0.2)	1.8 (0.3)
Loss of 3 or more workdays	2.0 (0.3)	1.9 (0.9)	4.2 (1.0)	0.8 (0.2)	1.9 (0.3)
Illness kept from duty >1 week	0.3 (0.1)	0.2 (0.2)	** (**)	0.2 (0.1)	0.2 (0.1)
Spouse left	0.4 (0.1)	0.3 (0.1)	0.2 (0.1)	0.1 (**)	0.3 (0.1)
Arrested for driving while impaired	1.3 (0.2)	2.0 (0.4)	2.9 (0.8)	1.0 (0.2)	1.6 (0.2)
Arrested, non-driving incident	1.3 (0.3)	0.9 (0.4)	1.9 (0.2)	0.7 (0.2)	1.1 (0.2)
Incarcerated	0.9 (0.3)	1.7 (0.7)	2.2 (0.6)	0.5 (0.1)	1.2 (0.2)
Fights	2.6 (0.5)	3.4 (1.7)	7.9 (1.1)	0.9 (0.1)	2.9 (0.6)
Did not get promoted	1.2 (0.3)	0.2 (0.1)	2.1 (0.8)	0.4 (0.1)	0.8 (0.1)
Entered rehabilitation or treatment program	0.4 (0.2)	0.5 (0.4)	1.4 (0.4)	0.3 (0.1)	0.5 (0.1)
Any serious consequences*	8.0 (1.1)	8.4 (3.2)	14.8 (2.1)	3.5 (0.4)	7.6 (1.1)
Productivity Loss	14.8 (1.4)	20.1 (4.1)	25.6 (1.9)	10.6 (0.5)	16.4 (1.4)
Dependence	5.4 (0.7)	5.2 (1.0)	11.2 (1.7)	2.7 (0.3)	5.2 (0.4)

Note: Table values are percentages (with standard errors in parentheses).

*One or more occurrences of the items noted above.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.23 Alcohol Use Negative Effects, Past 12 Months, by Pay Grade

Measure/Pay Grade	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Serious Consequences										
E1-E3	23.9	(3.1)	+	(+)	23.1	(2.5)	8.2	(1.8)	19.2	(3.9)
E4-E6	7.3	(1.3)	6.8	(1.1)	12.2	(2.0)	3.9	(0.4)	6.6	(0.6)
E7-E9	2.5	(0.4)	3.4	(0.9)	3.7	(0.4)	1.4	(0.4)	2.5	(0.3)
W1-W4	1.4	(0.8)	2.5	(1.7)	3.1	(1.6)	*	(*)	1.7	(0.7)
O1-O3	1.4	(0.6)	1.3	(1.1)	3.8	(2.0)	1.0	(0.8)	1.4	(0.5)
O4-O10	1.5	(0.8)	0.1	(0.1)	0.2	(0.2)	0.2	(0.2)	0.6	(0.4)
Productivity Loss										
E1-E3	26.3	(3.4)	+	(+)	32.9	(3.3)	17.0	(1.9)	29.1	(4.2)
E4-E6	16.5	(1.5)	18.3	(2.5)	24.7	(2.4)	11.6	(0.6)	16.3	(1.0)
E7-E9	6.1	(0.8)	11.3	(1.9)	8.2	(1.2)	7.3	(1.1)	8.3	(0.7)
W1-W4	5.4	(1.4)	17.5	(4.5)	8.7	(2.4)	*	(*)	7.5	(1.3)
O1-O3	7.1	(2.2)	10.8	(2.1)	20.5	(5.1)	5.8	(1.1)	8.5	(1.1)
O4-O10	5.6	(0.7)	7.6	(1.2)	7.8	(1.2)	4.3	(0.5)	5.7	(0.5)
Dependence										
E1-E3	15.5	(2.4)	12.6	(1.7)	19.1	(2.1)	6.1	(1.4)	13.5	(1.0)
E4-E6	5.1	(0.8)	4.1	(1.1)	8.1	(1.9)	2.7	(0.3)	4.3	(0.5)
E7-E9	1.7	(0.2)	1.4	(0.3)	2.2	(0.4)	1.2	(0.5)	1.6	(0.4)
W1-W4	3.6	(2.2)	0.1	(0.1)	0.1	(0.1)	*	(*)	2.7	(1.7)
O1-O3	1.0	(0.6)	1.2	(1.0)	**	(**)	1.4	(0.8)	1.1	(0.4)
O4-O10	0.5	(0.2)	0.4	(0.4)	2.7	(1.0)	0.2	(0.2)	0.5	(0.2)

Note: Table values are percentages of all personnel (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

+Unreliable estimate.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.24 Drug Use Negative Effects, Past 12 Months, by Pay Grade

Negative Effect/ Pay Grade	Service								Total DoD	
	Army		Navy		Marine Corps		Air Force			
Serious Consequences										
E1-E3	4.8	(1.8)	1.7	(1.0)	0.7	(0.7)	**	(**)	1.8	(0.6)
E4-E6	0.4	(0.2)	**	(**)	**	(**)	**	(**)	0.1	(0.1)
E7-E9	0.2	(0.2)	0.1	(0.1)	**	(**)	**	(**)	0.1	(0.1)
W1-W4	**	(**)	**	(**)	**	(**)	**	(**)	*	(*)
O1-O3	**	(**)	**	(**)	**	(**)	**	(**)	**	(**)
O4-O10	0.4	(0.3)	**	(**)	**	(**)	**	(**)	0.1	(0.1)
Productivity Loss										
E1-E3	4.1	(1.9)	3.3	(1.4)	2.7	(1.4)	0.4	(0.4)	2.8	(0.7)
E4-E6	0.5	(0.2)	0.4	(0.2)	0.9	(0.8)	0.1	(0.1)	0.4	(0.1)
E7-E9	0.1	(0.1)	0.1	(0.1)	0.1	(0.1)	**	(**)	0.1	(0.1)
W1-W4	**	(**)	**	(**)	**	(**)	**	(**)	*	(*)
O1-O3	**	(**)	**	(**)	**	(**)	**	(**)	**	(**)
O4-O10	**	(**)	**	(**)	**	(**)	**	(**)	**	(**)

Note: Table values are percentages of all personnel (with standard errors in parentheses).

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table D.25 Demographic Characteristics of Army Personnel Who Served or Did Not Serve in Operation Desert Shield/Desert Storm

Characteristic	Status: Served in Desert Storm (N=1,245)		Status: Did Not Serve in Desert Storm (N=3,626)		Total[a] (N=4,886)	
Sex						
Male	90.5	(1.9)	84.1	(1.7)	86.2	(1.5)
Female	9.5	(1.9)	15.9	(1.7)	13.8	(1.5)
Race/Ethnicity						
White, non-Hispanic	55.4	(2.1)	58.4	(1.9)	57.4	(1.7)
Black, non-Hispanic	29.4	(2.5)	26.4	(2.0)	27.3	(1.8)
Hispanic	10.5	(1.0)	10.0	(1.1)	10.3	(0.9)
Other	4.6	(0.9)	5.2	(0.6)	5.0	(0.5)
Education[b]						
Less than high school graduate	0.8	(0.4)	34.8	(3.1)	0.6	(0.1)
High school graduate or GED	44.7	(3.1)	43.3	(2.0)	38.0	(2.9)
Some college	39.2	(2.5)	43.3	(2.0)	42.1	(1.8)
College graduate or higher	15.4	(2.7)	21.4	(3.6)	19.4	(3.3)
Age[b]						
20 and under	10.0	(1.3)	10.5	(1.5)	10.3	(1.1)
21-25	30.1	(2.2)	26.7	(2.4)	27.8	(2.2)
26-34	39.1	(1.4)	35.9	(1.3)	37.0	(1.1)
35 and older	20.8	(2.4)	26.9	(3.1)	25.0	(2.9)
Pay Grade[b]						
E1-E3	11.1	(2.3)	14.5	(2.1)	13.4	(1.7)
E4-E6	64.4	(2.8)	54.0	(2.6)	57.4	(2.5)
E7-E9	8.9	(0.8)	12.4	(1.2)	11.3	(1.0)
W1-W4	3.3	(0.8)	2.2	(0.4)	2.5	(0.5)
O1-O3	7.9	(1.0)	9.3	(1.2)	8.8	(1.0)
O4-O10	4.4	(2.0)	7.6	(2.7)	6.6	(2.5)
Region[b]						
Americas	77.8	(4.9)	65.8	(5.1)	69.6	(4.2)
North Pacific	2.2	(1.6)	6.9	(4.3)	5.5	(3.5)
Other Pacific	0.4	(0.2)	5.0	(0.5)	3.5	(0.2)
Europe	19.7	(4.7)	22.3	(4.4)	21.4	(3.8)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents.

[a]Includes 15 respondents who did not indicate whether they served or did not serve in Operation Desert Shield/Desert Storm.

[b]At the time the Worldwide Survey was administered in 1992.

Table D.26 Sociodemographic Characteristics of Navy Personnel Who Served or Did Not Serve in Operation Desert Shield/Desert Storm

Sociodemographic Characteristic	Status: Served in Desert Storm (N=657)		Status: Did Not Serve in Desert Storm (N=3,319)		Total[a] (N=4,002)	
Sex						
Male	92.7	(2.2)	77.7	(4.2)	80.1	(4.0)
Female	7.3	(2.3)	22.3	(4.2)	19.9	(4.0)
Race/Ethnicity						
White, non-Hispanic	64.1	(3.3)	69.0	(2.0)	68.4	(2.0)
Black, non-Hispanic	15.1	(2.5)	18.2	(2.3)	17.7	(1.9)
Hispanic	11.5	(3.7)	6.0	(0.9)	6.8	(1.0)
Other	9.3	(2.0)	6.7	(1.4)	7.1	(1.4)
Education[b]						
Less than high school graduate	0.3	(0.3)	0.8	(0.2)	0.7	(0.2)
High school graduate or GED	45.8	(2.7)	46.0	(4.6)	46.1	(4.2)
Some college	41.8	(2.3)	36.7	(1.9)	37.4	(1.8)
College graduate or higher	12.2	(3.3)	16.6	(3.7)	15.8	(3.2)
Age[b]						
20 and under	5.2	(1.8)	11.3	(2.1)	10.3	(1.9)
21-25	34.9	(4.5)	32.2	(3.6)	32.9	(3.1)
26-34	33.6	(6.4)	36.1	(2.1)	35.7	(2.2)
35 and older	26.2	(2.3)	20.4	(3.3)	21.2	(3.0)
Pay Grade[b]						
E1-E3	+	(+)	20.6	(4.2)	20.2	(4.6)
E4-E6	64.9	(5.0)	57.5	(4.2)	58.4	(4.1)
E7-E9	9.9	(1.4)	9.8	(1.6)	9.8	(1.4)
W1-W4	0.6	(0.1)	0.5	(0.1)	0.5	(0.1)
O1-O3	4.7	(1.7)	7.2	(2.1)	6.7	(1.8)
O4-O10	4.4	(1.3)	4.5	(1.5)	4.4	(1.4)
Region[b]						
Americas	87.7	(3.1)	86.7	(3.0)	87.0	(2.6)
North Pacific	4.5	(1.6)	3.3	(0.7)	3.4	(0.8)
Other Pacific	3.6	(0.7)	6.8	(1.6)	6.3	(1.2)
Europe	4.3	(2.4)	3.2	(1.7)	3.3	(1.7)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents.

[a]Includes 26 respondents who did not indicate whether they served or did not serve in Operation Desert Shield/Desert Storm.

[b]At the time the Worldwide Survey was administered in 1992.

+Unreliable estimate.

Table D.27 Sociodemographic Characteristics of Marine Corps Personnel Who Served or Did Not Serve in Operation Desert Shield/ Desert Storm

Sociodemographic Characteristic	Status					
	Served in Desert Storm (N=856)		Did Not Serve in Desert Storm (N=1,650)		Total[a] (N=2,509)	
Sex						
Male	98.5	(0.4)	94.3	(0.8)	96.1	(0.4)
Female	1.5	(0.4)	5.7	(0.8)	3.9	(0.4)
Race/Ethnicity						
White, non-Hispanic	70.4	(2.9)	67.5	(2.1)	68.9	(1.3)
Black, non-Hispanic	15.2	(2.3)	22.7	(2.0)	19.3	(1.4)
Hispanic	11.2	(2.8)	5.8	(0.8)	8.1	(1.3)
Other	3.2	(1.3)	4.1	(1.2)	3.7	(0.9)
Education[b]						
Less than high school graduate	1.4	(0.5)	0.6	(0.4)	1.0	(0.3)
High school graduate or GED	64.1	(4.4)	61.8	(4.1)	62.7	(4.0)
Some college	24.3	(3.0)	26.1	(2.8)	25.5	(2.6)
College graduate or higher	10.2	(2.9)	11.4	(2.0)	10.8	(2.2)
Age[b]						
20 and under	9.5	(3.5)	26.3	(3.5)	19.0	(3.4)
21-25	50.1	(5.2)	28.6	(1.9)	38.2	(4.0)
26-34	28.4	(3.4)	29.0	(2.4)	28.6	(1.4)
35 and older	12.0	(3.3)	16.0	(3.5)	14.3	(3.4)
Pay Grade[b]						
E1-E3	33.3	(4.6)	45.5	(5.8)	40.3	(3.6)
E4-E6	47.9	(2.5)	34.6	(4.1)	40.5	(2.5)
E7-E9	7.1	(0.7)	9.4	(1.9)	8.3	(1.4)
W1-W4	1.2	(0.5)	1.0	(0.2)	1.1	(0.3)
O1-O3	7.7	(1.4)	5.7	(1.1)	6.5	(0.3)
O4-O10	2.8	(1.6)	3.8	(1.6)	3.3	(1.6)
Region[b]						
Americas	87.9	(5.4)	+	(+)	77.9	(7.4)
North Pacific	+	(+)	+	(+)	+	(+)
Other Pacific	6.8	(4.0)	6.4	(1.3)	6.6	(1.5)
Europe	0.3	(0.3)	2.3	(2.2)	1.4	(1.4)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents.

[a]Includes 3 respondents who did not indicate whether they served or did not serve in Operation Desert Shield/Desert Storm.

[b]At the time the Worldwide Survey was administered in 1992.

+Unreliable estimate.

Table D.28 Sociodemographic Characteristics of Air Force Personnel Who Served or Did Not Serve in Operation Desert Shield/ Desert Storm

Sociodemographic Characteristic	Status: Served in Desert Storm (N=680)		Status: Did Not Serve in Desert Storm (N=4,315)		Total[a] (N=4,998)	
Sex						
Male	90.8	(2.1)	83.4	(1.4)	84.6	(1.0)
Female	9.1	(2.2)	16.6	(1.4)	15.4	(1.0)
Race/Ethnicity						
White, non-Hispanic	76.6	(2.1)	74.4	(2.0)	74.8	(1.8)
Black, non-Hispanic	12.9	(1.4)	14.9	(1.7)	14.5	(1.6)
Hispanic	8.0	(2.0)	6.7	(0.8)	6.9	(0.8)
Other	2.4	(0.4)	4.1	(0.4)	3.8	(0.3)
Education[b]						
Less than high school graduate	**	(**)	**	(**)	**	(**)
High school graduate or GED	30.9	(1.8)	20.2	(1.6)	22.0	(1.8)
Some college	53.2	(1.7)	52.3	(2.4)	52.5	(2.1)
College graduate or higher	15.8	(1.6)	27.4	(3.7)	25.5	(3.4)
Age[b]						
20 and under	5.2	(0.9)	5.9	(0.9)	5.8	(0.8)
21-25	26.3	(2.4)	23.1	(1.9)	23.6	(1.8)
26-34	47.1	(2.2)	41.4	(1.7)	42.4	(1.4)
35 and older	21.4	(2.1)	29.6	(3.2)	28.2	(3.0)
Pay Grade[b]						
E1-E3	10.1	(1.7)	13.2	(1.6)	12.6	(1.4)
E4-E6	68.7	(2.6)	54.2	(3.3)	56.6	(3.0)
E7-E9	8.6	(1.3)	11.1	(0.9)	10.7	(0.8)
W1-W4	*	(*)	*	(*)	*	(*)
O1-O3	8.4	(0.9)	12.9	(1.7)	12.2	(1.5)
O4-O10	4.1	(1.2)	8.6	(3.1)	7.9	(2.8)
Region[b]						
Americas	+	(+)	80.8	(1.8)	80.2	(2.3)
North Pacific	2.6	(0.7)	4.7	(0.6)	4.3	(0.5)
Other Pacific	0.4	(0.1)	2.0	(0.2)	1.7	(0.2)
Europe	+	(+)	12.6	(1.6)	13.7	(2.3)

Note: Table values are column percentages (with standard errors in parentheses). N's are unweighted counts of respondents.

*There are no warrant officers in the Air Force.

**Estimate rounds to zero.

[a]Includes 3 respondents who did not indicate whether they served or did not serve in Operation Desert Shield/Desert Storm.

[b]At the time the Worldwide Survey was administered in 1992.

+Unreliable estimate.

APPENDIX E

CALCULATION OF SELECTED MEASUREMENT INDEXES

APPENDIX E

CALCULATION OF SELECTED MEASUREMENT INDEXES

This appendix provides details about the construction of a variety of indexes that we have used throughout this report. We describe first alcohol indexes and then drug indexes.

E.1 Alcohol Use Indexes

This section describes the construction of three alcohol indexes: the military drinking norms index, the drinking mood alteration index, and the average daily ounces of ethanol index. The items comprising the first two indexes are presented in Table E.1.

E.1.1 Military Drinking Norms Index

We constructed the military drinking norms index from the four questionnaire items listed in the top half of Table E.1, basing it on results of a correlational analysis of items listed in Questions 34 and 47 in the questionnaire (Appendix G). Respondents answered items for this index on a 5-point Likert-type scale anchored with strongly agree (5) and strongly disagree (1); "Don't know/no opinion" responses were scored on the midrange of the scale (3). We computed the index score by summing item responses for the four items after appropriate reverse scoring of negatively phrased items. The sum ranged from 4 to 20.

The index indicates beliefs about the climate that exists in the military toward alcohol use. Higher scores reflect a stronger belief that military norms encourage drinking.

E.1.2 Drinking Mood Alteration Index

The drinking mood alteration index comprised five questionnaire items shown in Table E.1 (from Question 27) that assessed reasons for drinking. All of these items pertained to drinking to alter one's mood in some way. The index that we developed was the mean of the importance scores across the items. Respondents indicated how important these reasons were to their drinking along a four-point scale that ranged from not at all important (1) to very important (4). We averaged item scores to yield the index score, which retained the item range of 1 to 4. A high score on the index reflected a tendency to use alcohol to alter one's mood. We did not complete the index for abstainers (persons who reported no alcohol use).

Table E.1 Drinking-Related Attitudinal Indexes

Index	Items Comprising Index
Military Drinking Norms Index (Range = 4-20)	
	• Drinking is part of being in the military. • The number of social events at this installation where alcohol is available makes drinking easy. • Drinking is just about the only recreation available at this installation. • At parties or social functions at this installation, everyone is encouraged to drink.
Drinking Mood Alteration Index (Range = 1-4)	
	Reason for drinking: • To forget my worries. • To relax. • To help cheer me up when I am in a bad mood. • To help me when I am depressed or nervous. • To help me when I am bored and have nothing to do.

E.1.3 Average Daily Ounces of Ethanol Index

The average daily ethanol consumption index we 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, we computed daily volume separately for beer, wine, and hard 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). We computed each frequency 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 daily volume resulting from typical drinking days was to determine the typical quantity (Qn) of each beverage respondents consumed during the past 30 days, on days when they consumed the given beverage (Questions 20, 23, and 26). For quantities up through 8 beers, glasses of wine, or drinks of liquor, the code we used was the exact number that the respondent indicated on Questions 20, 23, and 26.

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 wine in the past 30 days	0.000	0/30

[a]Frequency of consumption of given beverage during past 30 days.

For larger quantities of each beverage for which the answer was a range, the value we used was the midpoint of the range; for example, we coded 9-11 beers as 10. The codes we used for the highest quantity were 22 beers, 15 glasses (for wine), and 22 drinks (for hard liquor. We specified the size of a glass of wine as 4 ounces (standard wine glass). We employed two additional questionnaire items to account for variations in the size of beer containers and strength of drinks containing liquor (Questions 19 and 25). Respondents indicated the size can or bottle of beer they usually drank (Question 19), with alternatives of 8-, 12-, or 16-ounce containers, 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, we determined typical quantities for beer and liquor by multiplying (a) the number of cans or drinks typically consumed by (b) the number of ounces of the given beverage they contained. Since we used the standard 4-ounce size for wine glasses, the typical quantity for wine was simply four times the number of glasses consumed on a typical day when the respondent drank wine. Once we had determined the typical quantity for each beverage, we multiplied it 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. We made the transformations by weighting ounces of beer by .04, wine by .12, and liquor by .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. Since individuals consuming large quantities of wine on a regular basis often drink fortified 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 .18 (rather than .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 on which they consume larger quantities of alcohol. 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. However, as the quantity of alcohol consumed or the number of atypical days becomes larger, 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 consumption of such individuals. In light of the importance of accounting for the volume of alcohol consumed on atypical days, we also measured the frequency of consuming eight or more cans, glasses, or drinks of beer, wine, or liquor in the last year (Questions 31, 32, and 33). 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). We coded the quantity of ethanol consumed on such atypical drinking days as 5 ounces (i.e., 10 cans, glasses, or drinks, each containing 0.5 ounces 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).

We combined the volumes resulting from typical and atypical consumption days in a straightforward manner. For each beverage, we estimated the number of days during the past year on which the beverage was consumed 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, 365xF, 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, we set the term (365xF - D) to 0. We then multiplied each number of days 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:

$$AQnF = \frac{5D + Qn(365xF-D)}{365},$$

where

AQnF = the average daily volume of ethanol consumed in the form of the given beverage,

D = the 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 = the volume of ethanol consumed on typical drinking days for the given beverage, and

F = the 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) We did not compute the composite and total volume measures for individuals for whom we could not calculate any typical beverage-specific volume; and (b) the maximum value we permitted for the composite and total volume measures was 30 ounces of ethanol per day.

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 atypical high consumption for given beverage during past year.

E.2 Drug Use Indexes

This section describes how we constructed six drug use attitudinal indexes: inclination to use drugs, drug treatment climate, social disapproval, installation drug use norms, beliefs about marijuana use, and beliefs about the harmful effects of drugs. We based the indexes on results of a correlational analysis of items in Questions 65, 68, and 74 in the questionnaire. Individual items that we used for these indexes are shown in Table E.4. Respondents answered these items using a 5-point scale ranging from strongly

agree (5) to strongly disagree (1). We summed item scores after appropriate reversal for negative item phrasing to yield the index score.

E.2.1 Inclination to Use Drugs Index

The index of inclination to use drugs in the absence of testing consisted of three items (Table E.4) concerning attitudes about the deterrent effects of the military urinalysis testing program. Scores could range from 3 to 15 and high scores indicated that personnel would be more likely to use drugs if there were no testing.

E.2.2 Drug Treatment Climate Index

The drug treatment climate index consisted of responses to four items noted in Table E.4 concerning respondents' perceptions of barriers to seeking treatment for drug problems. Scores could range from 4 to 20, with high scores indicating beliefs that there are barriers to seeking treatment for drug problems.

E.2.3 Social Disapproval of Drug Use Index

The social disapproval of drug use index consisted of items that assessed the views in a person's social network concerning drug use. Scores could range from 3 to 15, and a higher score reflected a stronger belief that others in a person's social network do not approve of drug use.

E.2.4 Installation Drug Use Norms Index

The fourth index in Table E.4 consisted of items that assessed the norms of drug use at the installation. Scores could range from 3 to 15. A high score indicated a strong belief that installation norms encourage drug use.

E.2.5 Beliefs About Marijuana Use Index

The fifth drug index concerned attitudes about use of marijuana and was assessed by the five items noted in Table E.4. Index scores could range from 5 to 25, and high scores indicated negative attitudes about military personnel using marijuana.

E.2.6 Beliefs About Harmful Effects of Drugs Index

The final drug index consisted of four items shown in Table E.4 that assessed beliefs about the harmful effects of drug use on health and work. Higher scores indicated stronger beliefs about the potential harmful effects of drugs. The range was from 4 to 20.

Table E.4 Drug-Related Attitudinal Indexes

Index	Items Comprising Index
Inclination to Use Drugs Index (Range = 3-15)	• People in my unit would be more inclined to use drugs if the military did not have urinalysis testing. • I would be more inclined to use drugs if the military did not have urinalysis testing. • I would not use drugs even if there were no urinalysis testing.
Drug Treatment Climate Index (Range = 4-20)	• The personnel at this installation sincerely try to help people who have a drug problem. • Persons who try to get treatment for drug problems will later experience surprise searches of themselves, their auto, or their quarters. • Persons who want treatment for their drug problems have difficulty getting off-duty to attend counseling sessions. • There is no way to get help for a drug problem without one's commander finding out.
Social Disapproval of Drug Use Index (Range = 3-15)	• The people I associate with off-duty think that I should not use marijuana (or would disapprove if I did use marijuana). • Most of my friends use drugs, at least marijuana. • My spouse or the person I date disapproves of my using drugs (or would disapprove if I did use drugs).
Installation Drug Norms Index (Range 3-15)	• At parties or social functions at this installation, it's easy to get away with using drugs. • There's always a party somewhere at or near this installation where drugs are being used. • Using drugs is just about the only recreation available at this installation.
Beliefs About Marijuana Use Index (Range = 5-25)	• Anyone detected using marijuana should be discharged. • I am opposed to personnel in my Service using marijuana at any time anywhere. • I am opposed to personnel in my Service using marijuana only if it hurts their performance. • I favor being able to use marijuana when I'm off-duty. • I might use (more) marijuana if it were easier to get.
Beliefs About Harmful Effects of Drugs Index (Range = 4-20)	• Using drugs would mess up my mind. • Using drugs would interfere with my health or physical fitness. • Using drugs would interfere with my work. • There are some times at work when I could use an "upper."

APPENDIX F

TECHNICAL DISCUSSION OF STANDARDIZATION APPROACHES AND MULTIVARIATE ANALYSES

APPENDIX F

TECHNICAL DISCUSSION OF STANDARDIZATION APPROACHES AND MULTIVARIATE ANALYSES

In this appendix, we present technical details of the standardization procedures and multivariate analyses described in earlier chapters of the report. We first describe our approach to standardization and follow this with a discussion of multivariate regression and logistic regression. We then present tables showing parameter estimates from the analyses.

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 we have compared substance use between Services, between the military and the civilian population, and between the military in 1992 and the military in 1980. When estimating such differences, however, it is often necessary or informative to take into account other confounding factors that are not of interest themselves but that could cloud the effect being studied. For example, we expected substance use to vary by demographic characteristics such as age, race, sex, marital status, and education, and we expected to see differences in the distributions of some or all of these variables in the various groups we compared in this report.

Standardization is a technique commonly used to control for important differences (such as demographic characteristics) between groups that are related to the outcome in question (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 variables, all other things being equal (Little, 1982).

We used two related techniques for the standardized comparisons we presented in this report: direct standardization and regression standardization.

- With direct standardization, cells defined by the complete cross-classification of the standardizing variables are formed. Then the cell means are weighted by the proportions in the standardizing population.

- With regression standardization, a regression model is used to estimate the effect of the study factor while controlling for confounding variables. The model is used to predict adjusted or standardized means for the study groups by assuming that the values of the confounding variables are the same for each group. Then, comparison of the adjusted means partially removes the effect of the confounding variables. The regression approach is analogous to the analysis of covariance (for example, see Snedecor & Cochran, 1967).

With a completely interacted regression model, regression standardization and direct standardization yield identical results. Williams and LaVange (1983) discuss direct and regression standardization in the sample survey context.

Direct standardization requires separate cell estimates for the complete cross-classification of all of the confounding and study variables. This limits the number of confounding variables that can be controlled due to small sample sizes in each cell of the cross-classification. With the regression approach, on the other hand, the complete interaction of all the confounding variables need not be included in the model. Regression does have the drawback that a separate model must be fit for each of the confounding variables.

For the standardized comparisons in this report, we used direct standardization when the cell sizes would permit, and regression analysis when we wanted to include more confounding variables than the sample sizes would permit for direct standardization. We used the SUDAAN (RTI SUrvey DAta ANalysis software) procedures DESCRIPT (for direct standardization), and REGRESS (for regression analysis); these procedures provide sample design-based estimates of the standard errors of the standardized and unstandardized estimates. We calculated t tests to assess the significance of the differences.

F.1.1 Demographic Variables Included in Standardizations

We considered these demographic characteristics for standardization variables: age, race/ethnicity, sex, educational attainment, and marital status. It should be noted that we did not use the same or all of the demographic variables in all of the standardized comparisons presented in this report. In order to have an effect on the standardized estimates or differences, the distribution of the potential confounding variable in question must differ in the two populations, and the outcome variable must also vary by the levels of the confounding variable. For example, if the race distribution is the same in two populations, then it makes no difference in the estimate if race is or is not included as a standardizing variable. If the estimates of the outcome variable are the same, say for males and females, then it makes no difference in the standardized estimate if gender is or is not included.

Including all variables in every standardization that we did for this report would have been ideal for consistency. However, including extra variables may also increase the variance of the estimate without appreciably changing the estimate. Further, incorporating additional variables increases the number of standardizing cells; this decreases the sample size in each cell.

F.1.2 Standardized Comparisons in this Report

Standardization of the 1982 to 1992 DoD Distributions to the 1980 Distribution. We standardized the 1992 Worldwide survey data (and the 1988, 1985, and 1982 data) to the 1980 population distribution of Service, age, education, and marital status. In this case, the 1980 population was considered the "control" population. For each measure (proportion of drug users, proportion of smokers, ounces of ethanol, etc.), we first calculated the estimate of 1992 use for each of the standardizing cells formed by the crosstabulation of Service, age, education, and marital status. We then weighted these estimates by the estimated proportion of the 1980 military population that fell into each cell. Hence, the 1992 data were standardized to the joint population distribution in 1980 of the standardizing variables, and the standardized estimate was an estimate of what drug use, smoking, etc., might be in 1992 if the 1992 military population were younger, less educated, and less likely to be married, as in 1980. We did not include gender and race/ethnicity in this standardization. The marginal distributions of these characteristics were somewhat similar to the distribution in 1980, which suggests that their inclusion or exclusion would have had little effect on the standardized estimate.

Standardization of Services to the DoD Distribution for Service Comparisons on Substance Use. Examination of the descriptive statistics of substance use by demographics indicates that there were differences among the Services, and also among demographic groups. Further, the demographic distributions of age, race, sex, education, and family status differed by Service. For this reason, we chose to compare Service-specific estimates after standardizing to the total DoD distribution of these five demographic characteristics. Direct standardization would have required that we compute cell-specific means in the complete crossclassification of service and the demographic characteristics. Because sample sizes in the cells were too small to provide stable estimates, we used a regression standardization. We fit a separate linear regression model for each of the Services that included as main effects age, race/ethnicity, sex, educational attainment, and family status. Then we calculated the predicted value, using total DoD proportions.

Standardization of Civilian Data to the Military Distribution. We compared data on substance use from the 1991 NHSDA with that from the 1992 military population. For this analysis, we compared rates of military and civilian populations by standardizing the civilian data to match the military population. For comparability we restricted the NHSDA data set to persons between age 18 and 55 who were not currently on active duty in the military, and we restricted the military data 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 large enough to permit us to use direct standardization, with standardizing cells formed by the cross of sex, age, race/ethnicity, educational attainment, and marital status.

We also compared data on beliefs and attitudes about AIDS from the 1990 NHIS with data from the 1992 military population. We standardized the civilian data to match the total military population worldwide, ages 18 to 55. We standardized to the joint distribution of age, education, and race/ethnicity. We found that in the NHIS data there were no significant differences in AIDS beliefs or attitudes by gender or by marital status. Consequently, standardizing all five of the variables to the joint distribution gave results that were no different from the ones we obtained by standardizing to the joint distribution of age, race/ethnicity, and education.

F.2 Multivariate Regression Analyses

We conducted two types of multivariate analyses: multiple linear regression analyses and multivariate logistic regression. We used the former to model continous dependent measures (e.g., general negative behaviors) and the latter to model binary dependent measures (e.g., drug use versus no drug use). Ordinary linear multiple regression expresses an individual's probability of exhibiting the outcome behavior as a linear function of the independent variables, whereas multiple logistic regression expresses the natural logarithm of the individual's odds (i.e., ln(p/1-p) of exhibiting the outcome behavior as a linear function of the independent variables.

There are several reasons for using logistic regression instead of ordinary least squares regression for binary variables:

- it assumes a more reasonable nonlinear relationship between the independent variables and the probability of the outcome;
- it does not permit negative predicted probabilities; and
- 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 regression model indicate the 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, the regression parameter indicates the difference in the log odds between the category coded 1 and the category coded 0 for that independent variable. An estimated parameter that is not significantly different from 0 indicates that the associated independent variable is not associated with the probability of the outcome occurring; 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(B)) 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 ratio of the odds of the outcome occurring for the category coded 1, to the odds of the outcome occurring for the category coded 0.

We fitted logistic regression models for heavy alcohol use and any cigarette smoking separately for enlisted males, enlisted females, and officers. We did not analyze female officers separately because the sample size was too small to generate precise parameter estimates. For drug use, we fitted a model only for enlisted males because of the small number of drug users for enlisted females and officers. For negative behaviors, we fitted ordinary least squares regression models for enlisted males, enlisted females, and officers.

For each of the models, we modeled the outcome variable as a function of demographic variables only, and again as a function of demographic, behavioral and social/psychological variables. Parameter estimates for both types of models are presented in this appendix.

We used the SUDAAN regression procedures REGRESS and LOGIST (discussed in Appendix B) for estimating the parameters, preparing the variance-covariance matrix, and performing statistical tests about the parameters.

Table F.1 Logistic Regression Models for Predicting Heavy Alcohol Use Among Enlisted Males[a]

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	1.53***	1.33*
Navy vs. Air Force	1.05	0.87
Marine Corps vs. Air Force	1.33**	1.32*
Race/Ethnicity		
Black vs. white	0.60***	0.58***
Hispanic vs. white	0.90	0.96
Other vs. white	0.72	0.62**
Education		
High school or less vs. beyond high school	1.48***	1.42***
Family Status		
Single vs. married, spouse present	1.99***	1.79***
Married, spouse not present vs. married, spouse present	1.77**	1.84*
Region		
Americas vs. Europe	0.90	0.89
North Pacific vs. Europe	0.83	0.89
Other Pacific vs. Europe	0.89	0.81
Pay Grade		
E1-E3 vs. E7-E9	1.72**	1.11
E4-E6 vs. E7-E9	1.26	1.16
Occupation		
Electronic Equipment Repair vs. Direct Combat	0.72	0.75
Communications & Intelligence vs. Direct Combat	0.81	0.98
Health Care vs. Direct Combat	0.86	0.97
Other Technical vs. Direct Combat	0.78	0.86
Functional Support vs. Direct Combat	0.63**	0.67*
Electrical/Mechanical vs. Direct Combat	0.82*	0.88
Craftsman vs. Direct Combat	0.93	1.01
Service & Supply vs. Direct Combat	0.78	0.76
Non-occupational vs. Direct Combat	1.01	0.99
Age	0.98**	0.99
Desert Storm		
Served vs. did not serve	1.10	1.01
Perceived Stress at Work		
High vs. low	--[b]	1.13
Moderate vs. low	--	1.03
Health Practices	--	0.87**
Drinking Mood Alteration Index	--	1.82***
Drinking Norms Index	--	0.99
Drink to Get Drunk	--	1.65***
Times at Work I Could Use a Drink	--	1.21***
Spouse or Person I Date Disapproves of My Drinking	--	0.97
Unweighted N	8711	8464
R^2	0.087	0.203

[a]Abstainers were excluded from these models.
[b]Not included in demographic model.
*p < .05 **p < .01 ***p < .001
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.2 Logistic Regression Models for Predicting Heavy Alcohol Use Among Enlisted Females[a]

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	1.54	1.41
Navy vs. Air Force	0.66	0.48
Marine Corps vs. Air Force	1.30	1.31
Race/Ethnicity		
Black vs. white	0.22**	0.26*
Hispanic vs. white	0.64	0.86
Other vs. White	0.60	0.68
Education		
High school or less vs. beyond high school	1.51	1.49
Family Status		
Single vs. married, spouse present	2.68**	3.24*
Married, spouse not present vs. married, spouse present	0.29*	0.29
Region		
Americas vs. Europe	1.22	1.55
North Pacific vs. Europe	3.18	4.27*
Other Pacific vs. Europe	1.51	1.74
Pay Grade		
E1-E3 vs. E7-E9	1.75	2.42
E4-E6 vs. E7-E9	0.94	1.15
Occupation		
Electronic Equipment Repair vs. Service & Supply	0.72	0.10
Communications & Intelligence vs. Service & Supply	1.30	1.73
Health Care vs. Service & Supply	0.49	0.96
Other Technical vs. Service & Supply	4.07	5.28
Functional Support vs. Service & Supply	0.94	1.51
Electrical/Mechanical vs. Service & Supply	2.06	3.98
Craftsman vs. Service & Supply	6.04*	20.76***
Non-occupational vs. Service & Supply	1.31	1.84
Age	1.02	1.05
Desert Storm		
Served vs. did not serve	1.03	1.68
Perceived Stress at Work		
High vs. low	--[b]	3.90
Moderate vs. low	--	6.13
Health Practices	--	0.84
Drinking Mood Alteration Index	--	2.14*
Drinking Norms Index	--	1.08*
Drink to Get Drunk	--	1.94*
Times at Work I Could Use a Drink	--	1.41*
Spouse or Person I Date Disapproves of My Drinking	--	0.82
Unweighted N	1055	1035
R^2	0.082	0.187

[a]Abstainers were excluded from these models.
[b]Not included in demographic model.
*p < .05 **p < .01 ***p < .001
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.3 Logistic Regression Models for Predicting Heavy Alcohol Use Among Officers[a]

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	2.10*	2.46*
Navy vs. Air Force	1.50	1.36
Marine Corps vs. Air Force	2.13	2.06
Race/Ethnicity		
Black vs. white	0.38	0.31
Hispanic vs. white	1.42	0.81
Other vs. white	2.18	2.25
Sex		
Male vs. female	3.20*	2.40
Education		
High school or less vs. beyond high school	1.34	2.55*
Family Status		
Single vs. married, spouse present	2.44**	2.06*
Married, spouse not present vs. married, spouse present	1.03	0.96
Region		
Americas vs. Europe	1.27	1.63
North Pacific vs. Europe	3.56*	3.93*
Other Pacific vs. Europe	0.82	0.96
Pay Grade		
W1-W4 vs. O4-O10	3.45***	3.30**
O1-O3 vs. O4-O10	2.01	2.39
Occupation		
General Officer vs. Tactical Operations	1.69	1.79
Intelligence vs. Tactical Operations	0.46	0.35
Engineering/Maintenance vs. Tactical Operations	1.55	2.20*
Scientist/Professional vs. Tactical Operations	0.21**	0.06
Health Care vs. Tactical Operations	0.62	0.84
Administrator vs. Tactical Operations	1.07	1.17
Supply vs. Tactical Operations	1.80	2.20
Non-occupational vs. Tactical Operations	2.15	1.20*
Age	1.00	1.03
Desert Storm		
Served vs. did not serve	0.96	0.74
Perceived Stress at Work		
High vs. low	--[b]	0.21
Moderate vs. low	--	0.33
Health Practices	--	0.85
Drinking Mood Alteration Index	--	3.98***
Drinking Norms Index	--	1.07
Drink to Get Drunk	--	2.96***
Times at Work I Could Use a Drink	--	1.02
Spouse or Person I Date Disapproves of My Drinking	--	0.95
Unweighted N	2877	2801
R^2	0.067	0.214

[a]Abstainers were excluded from these models.
[b]Not included in demographic model.
*p < .05 **p < .01 ***p < .001
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.4 Logistic Regression Models for Predicting Any Drug Use in the Past 12 Months Among Enlisted Males

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	3.13***	1.74**
Navy vs. Air Force	2.51***	1.53*
Marine Corps vs. Air Force	2.51***	1.62
Race/Ethnicity		
Black vs. white	0.49***	0.64
Hispanic vs. white	0.92	1.16
Other vs. white	0.42*	0.45
Education		
High school or less vs. beyond high school	0.89	0.90
Family Status		
Single vs. married, spouse present	1.70***	1.40*
Married, spouse not present vs. married, spouse present	2.47**	2.26*
Region		
Americas vs. Europe	1.49	1.88*
North Pacific vs. Europe	0.82	1.21
Other Pacific vs. Europe	1.18	1.42
Pay Grade		
E1-E3 vs. E7-E9	3.29***	2.45**
E4-E6 vs. E7-E9	1.63*	1.55
Occupation		
Electronic Equipment Repair vs. Direct Combat	0.79	0.54
Communications & Intelligence vs. Direct Combat	0.91	1.00
Health Care vs. Direct Combat	1.63	1.73
Other Technical vs. Direct Combat	1.05	1.01
Functional Support vs. Direct Combat	1.10	0.98
Electrical/Mechanical vs. Direct Combat	1.07	0.96
Craftsman vs. Direct Combat	1.13	1.09
Service & Supply vs. Direct Combat	1.11	0.95
Non-occupational vs. Direct Combat	1.03	1.02
Age	0.94***	0.98
Desert Storm		
Served vs. did not serve	1.56	1.40
Perceived Stress at Work		
High vs. low	--[a]	3.13**
Moderate vs. low	--	2.76*
Health Practices	--	0.91
Beliefs About Harmful Effects of Drugs	--	0.97
Inclination to Use Drugs in Absence of Testing	--	1.28***
Installation Norms Index	--	0.96
Social Disapproval Index	--	0.88***
Drug Treatment Climate	--	1.01
Attitudes About Marijuana Use	--	0.88***
Unweighted N	11045	10914
R^2	0.090	0.309

[a]Not included in demographic model.
*p < .05 **p < .01 ***p < .001
Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.5 Logistic Regression Models Predicting Any Smoking Among Enlisted Males

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	1.49***	1.50***
Navy vs. Air Force	1.24*	1.19
Marine Corps vs. Air Force	1.12	1.10
Race/Ethnicity		
Black vs. white	0.57***	0.61***
Hispanic vs. white	0.59***	0.64**
Other vs. white	0.71*	0.75*
Education		
High school or less vs. beyond high school	1.42***	1.42***
Family Status		
Single vs. married, spouse present	1.08	1.08
Married, spouse not present vs. married, spouse present	1.17	1.14
Region		
Americas vs. Europe	0.94	0.97
North Pacific vs. Europe	1.04	1.09
Other Pacific vs. Europe	1.00	1.07
Pay Grade		
E1-E3 vs. E7-E9	1.83***	1.85***
E4-E6 vs. E7-E9	1.25**	1.25**
Occupation		
Electronic Equipment Repair vs. Direct Combat	0.74	0.74*
Communications & Intelligence vs. Direct Combat	0.68**	0.67**
Health Care vs. Direct Combat	0.60*	0.57**
Other Technical vs. Direct Combat	0.73*	0.71*
Functional Support vs. Direct Combat	0.86	0.85
Electrical/Mechanical vs. Direct Combat	1.02	1.00
Craftsman vs. Direct Combat	1.38	1.30
Service & supply vs. Direct Combat	0.91	0.92
Non-occupational vs. Direct Combat	1.01	0.96
Age	1.03***	1.03***
Desert Storm		
Served vs. did not serve	1.05	1.05
Perceived Stress at Work		
High vs. low	--[a]	2.39***
Moderate vs. low	--	1.73***
Health Practices	--	0.79***
Unweighted N	11058	10916
R^2	0.040	0.062

[a]Not included in demographic model.

*p < .05 **p < .01 ***p < .001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.6 Logistic Regression Models Predicting Any Smoking Among Enlisted Females

Item/Comparison	Model/Odds Ratios: Demographic Variables Only	Model/Odds Ratios: Full Model
Service		
Army vs. Air Force	1.53	1.57
Navy vs. Air Force	1.09	1.02
Marine Corps vs. Air Force	2.36*	2.70**
Race/Ethnicity		
Black vs. white	0.27***	0.27***
Hispanic vs. white	0.45*	0.47*
Other vs. white	0.55	0.57
Education		
High school or less vs. beyond high school	1.73***	1.69**
Family Status		
Single vs. married, spouse present	1.35*	1.31*
Married, spouse not present vs. married, spouse present	0.44	0.47
Region		
Americas vs. Europe	0.90	0.89
North Pacific vs. Europe	1.00	0.98
Other Pacific vs. Europe	1.34	1.41
Pay Grade		
E1-E3 vs. E7-E9	1.37	1.39
E4-E6 vs. E7-E9	1.44	1.46
Occupation		
Electronic Equipment Repair vs. Service & Supply	2.55	2.88
Communications & Intelligence vs. Service & Supply	0.70	0.75
Health Care vs. Service & Supply	1.41	1.57
Other Technical vs. Service & Supply	1.10	1.25
Functional Support vs. Service & Supply	1.59	1.78*
Electrical/Mechanical vs. Service & Supply	1.48	1.50
Craftsman vs. Service & Supply	2.11	2.47
Non-occupational vs. Service & Supply	0.94	1.09
Age	1.06***	1.06***
Desert Storm		
Served vs. did not serve	1.36	1.38
Perceived Stress at Work		
High vs. low	--[a]	1.45
Moderate vs. low	--	0.94
Health Practices	--	0.80**
Unweighted N	1515	1501
R^2	0.112	0.130

[a]Not included in demographic model.

*p < .05 **p < .01 ***p < .001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.7 Logistic Regression Models Predicting Any Smoking Among Officers

Item/Comparison	Model/Odds Ratios	
	Demographic Variables Only	Full Model
Service		
Army vs. Air Force	1.38*	1.32
Navy vs. Air Force	1.43*	1.41*
Marine Corps vs. Air Force	1.42	1.54
Race/Ethnicity		
Black vs. white	0.73	0.69
Hispanic vs. white	1.25	1.34
Other vs. white	0.83	0.78
Sex		
Male vs. Female	1.28	1.43
Education		
High school or less vs. beyond high school	2.59*	2.52*
Family Status		
Single vs. married, spouse present	0.96	0.96
Married, spouse not present vs. married, spouse present	1.28	1.22
Region		
Americas vs. Europe	0.67**	0.69**
North Pacific vs. Europe	0.74	0.78
Other Pacific vs. Europe	0.78	0.83
Pay Grade		
W1-W4 vs. O4-O10	2.35***	2.46***
O1-O3 vs. O4-O10	1.31	1.32
Occupation		
General Officer vs. Tactical Operations	1.18	1.22
Intelligence vs. Tactical Operations	0.80	0.82
Engineering/Maintenance vs. Tactical Operations	0.73	0.73
Scientist/Professional vs. Tactical Operations	0.61	0.64
Health Care vs. Tactical Operations	0.67	0.67
Administrator vs. Tactical Operations	0.76	0.77
Supply vs. Tactical Operations	1.00	1.00
Non-occupational vs. Tactical Operations	1.08	1.17
Age	1.03	1.02
Desert Storm		
Served vs. did not serve	1.15	1.13
Perceived Stress at Work		
High vs. low	--[a]	2.19
Moderate vs. low	--	2.03
Health Practices	--	0.69***
Unweighted N	3490	3446
R^2	0.031	0.043

[a]Not included in demographic model.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.8 Linear Regression Models for Predicting General Negative Behaviors Among Enlisted Males

Item/Comparison	Model/Regression Parameters: Demographic Variables Only	Model/Regression Parameters: Full Model
Service		
Army vs. Air Force	1.6305***	1.0360***
Navy vs. Air Force	0.8548**	0.5487*
Marine Corps vs. Air Force	1.2926***	0.8587**
Race/Ethnicity		
Black vs. white	0.4853	1.4720***
Hispanic vs. white	-0.4168	0.0319
Other vs. white	0.1860	0.7620
Education		
High school or less vs. beyond high school	0.1133	0.1628
Family Status		
Single vs. married, spouse present	0.5169*	0.1279
Married, spouse not present vs. married, spouse present	0.9504**	0.6572*
Region		
Americas vs. Europe	0.3150	0.4528
North Pacific vs. Europe	-0.5391	-0.4490
Other Pacific vs. Europe	0.0615	0.2938
Pay Grade		
E1-E3 vs. E7-E9	2.4718***	2.4384***
E4-E6 vs. E7-E9	1.0120***	1.1550***
Occupation		
Electronic Equipment Repair vs. Direct Combat	-0.2639	-0.0617
Communications & Intelligence vs. Direct Combat	-0.8431*	-0.5614
Health Care vs. Direct Combat	-0.2926	-0.4274
Other Technical vs. Direct Combat	-0.7636	-0.5926
Functional Support vs. Direct Combat	-0.4335	-0.2450
Electrical/Mechanical vs. Direct Combat	0.2775	0.3553
Craftsman vs. Direct Combat	-1.1796**	-0.9200*
Service & Supply vs. Direct Combat	0.4175	0.6020
Non-occupational vs. Direct Combat	0.4766	0.2562
Age	-0.0764***	-0.0355*
Desert Storm		
Served vs. did not serve	0.5671*	0.3295
Perceived Stress at Work		
High vs. low	--[a]	3.8671***
Moderate vs. low	--	0.6921
Drinking Level		
Heavy vs. abstainer	--	2.3660***
Moderate/heavy vs. abstainer	--	1.4027***
Moderate vs. abstainer	--	0.5557
Infrequent/light vs. abstainer	--	0.9161
Drug Use		
Any use vs. no use	--	2.4724***
Unweighted N	11090	10961
R^2	0.074	0.183

[a]Not included in demographic model.

*p < .05 **p < .01 ***p < .001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.9 Linear Regression Models for Predicting General Negative Behaviors Among Enlisted Females

Item/Comparison	Model/Regression Parameters: Demographic Variables Only	Model/Regression Parameters: Full Model
Service		
Army vs. Air Force	1.3535**	1.1719*
Navy vs. Air Force	1.6399**	1.3685**
Marine Corps vs. Air Force	0.5366	0.6451
Race/Ethnicity		
Black vs. white	0.5043	1.0919*
Hispanic vs. white	-1.2021	-0.6441
Other vs. white	0.7231	0.7341
Education		
High school or less vs. beyond high school	-0.7066	-0.9433
Family Status		
Single vs. married, spouse present	-0.1188	-0.0483
Married, spouse not present vs. married, spouse present	1.1566	1.0225
Region		
Americas vs. Europe	-0.4432	-0.4671
North Pacific vs. Europe	-1.0812*	-1.0696*
Other Pacific vs. Europe	-0.8967	-1.0221
Pay Grade		
E1-E3 vs. E7-E9	0.6123	0.8021
E4-E6 vs. E7-E9	0.1370	0.2562
Occupation		
Electronic Equipment Repair vs. Service & Supply	-0.7983	-0.6315
Communications & Intelligence vs. Service & Supply	-2.8912***	-3.0686***
Health Care vs. Service & Supply	-1.0008	-0.9506
Other Technical vs. Service & Supply	-1.5518*	-1.5311*
Functional Support vs. Service & Supply	-1.3977*	-1.4922*
Electrical/Mechanical vs. Service & Supply	0.8190	0.4558
Craftsman vs. Service & Supply	-2.9182*	-2.8680
Non-occupational vs. Service & Supply	-0.6597	-0.3563
Age	-0.0866	-0.0834
Desert Storm		
Served vs. did not serve	-0.3237	-0.8343
Perceived Stress at Work		
High vs. low	--[a]	4.2999***
Moderate vs. low	--	0.9893
Drinking Level		
Heavy vs. abstainer	--	1.1469
Moderate/heavy vs. abstainer	--	-0.1401
Moderate vs. abstainer	--	0.5715
Infrequent/light vs. abstainer	--	0.1451
Drug Use		
Any use vs. no use	--	1.8618
Unweighted N	1517	1502
R^2	0.072	0.169

[a]Not included in demographic model.

*p < .05 **p < .01 ***p < .001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.10 Linear Regression Models for Predicting General Negative Behaviors Among Officers

Item/Comparison	Model/Regression Parameters: Demographic Variables Only	Model/Regression Parameters: Full Model
Service		
Army vs. Air Force	0.6301*	0.5907*
Navy vs. Air Force	0.4455	0.5033
Marine Corps vs. Air Force	0.5013	0.5227
Race/Ethnicity		
Black vs. white	0.4869	0.7749*
Hispanic vs. white	0.4869	0.4015
Other vs. white	0.9537	0.8282
Sex		
Male vs. female	-0.5308*	-0.6414
Education		
High school or less vs. beyond high school	0.1084	0.0368
Family Status		
Single vs. married, spouse present	0.0615	-0.0028
Married, spouse not present vs. married, spouse present	-0.1301	-0.1470
Region		
Americas vs. Europe	-0.6313*	-0.5045
North Pacific vs. Europe	-0.5213	-0.6915
Other Pacific vs. Europe	-0.6755	-0.5498
Pay Grade		
W1-W4 vs. O4-O10	-0.1862	-0.1522
O1-O3 vs. O4-O10	0.0829	0.0243
Occupation		
General Officer vs. Tactical Operations	-0.3360	-0.4514
Intelligence vs. Tactical Operations	-0.0408	0.1186
Engineering/Maintenance vs. Tactical Operations	0.3754	0.2851
Scientist/Professional vs. Tactical Operations	-0.0709	0.0652
Health Care vs. Tactical Operations	-0.2772	-0.3330
Administrator vs. Tactical Operations	0.4698	0.3620
Supply vs. Tactical Operations	0.2671	-0.0573
Non-occupational vs. Tactical Operations	0.4080	0.4342
Age	-0.0141	-0.0126
Desert Storm		
Served vs. did not serve	0.1826	0.0926
Perceived Stress at Work		
High vs. low	--[a]	2.1116***
Moderate vs. low	--	0.7642
Drinking Level		
Heavy vs. abstainer	--	2.4131**
Moderate/heavy vs. abstainer	--	0.2979
Moderate vs. abstainer	--	0.0652
Infrequent/light vs. abstainer	--	-0.0183
Drug Use		
Any use vs. no use	--	3.2320***
Unweighted N	3499	3469
R^2	0.026	0.087

[a]Not included in demographic model.

*p < .05 **p < .01 ***p < .001

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table F.11 Logistic Regression Coefficient Estimates

Independent Variables	Dependent Variables: Any Short Hospital Stay		Any Long Hospital Stay		Any Emergency Room Visit		Any Military Physician Visit		Any Civilian Physician Visit		Any Specialist Visit	
Intercept	-1.77*	(0.32)	-2.79*	(0.33)	0.33	(0.17)	0.22	(0.13)	-2.40*	(0.42)	-1.61*	(0.17)
Substance: (Neither excluded)												
Heavy Smoking	0.18	(0.12)	0.29	(0.17)	0.12	(0.07)	0.24*	(0.09)	0.04	(0.16)	0.06	(0.05)
Heavy Drinking	0.08	(0.18)	-0.24	(0.19)	0.05	(0.08)	-0.06	(0.08)	0.33*	(0.16)	-0.02	(0.09)
Service: (Air Force excluded)												
Army	0.05	(0.15)	0.58*	(0.13)	-0.19	(0.13)	-0.28	(0.07)	0.01	(0.20)	0.00	(0.08)
Navy	-0.68*	(0.22)	0.03	(0.19)	-0.73*	(0.16)	-0.16	(0.11)	0.20	(0.18)	-0.30*	(0.10)
Marines	-0.40	(0.26)	0.08	(0.23)	-0.63*	(0.16)	-0.22	(0.14)	-0.27	(0.23)	-0.24*	(0.09)
Race: (white excluded)												
Black	-0.12	(0.15)	0.12	(0.16)	-0.04	(0.08)	-0.40*	(0.07)	0.14	(0.17)	-0.17	(0.09)
Hispanic	0.12	(0.26)	-0.07	(0.16)	-0.16	(0.11)	-0.17	(0.12)	-0.06	(0.19)	-0.18	(0.11)
Other	0.53*	(0.20)	-0.11	(0.33)	-0.06	(0.12)	0.06	(0.12)	0.25	(0.23)	-0.10	(0.16)
Education: Greater than high school	0.12	(0.12)	0.06	(0.26)	-0.03	(0.07)	0.31*	(0.05)	0.23*	(0.10)	0.16*	(0.07)
Age	-0.03*	(0.01)	-0.03*	(0.01)	-0.03*	(0.00)	0.01*	(0.00)	-0.02*	(0.01)	0.02*	(0.01)
Female	0.91*	(0.14)	0.57*	(0.14)	0.38*	(0.11)	0.84*	(0.08)	0.94*	(0.13)	0.61*	(0.10)
Participation in Desert Storm/ Shield	-0.36*	(0.15)	-0.12	(0.18)	-0.17*	(0.08)	-0.03	(0.07)	0.08	(0.14)	-0.03	(0.07)
Unweighted N	15,885		16,017		16,020		16,044		15,919		15,959	
F-value (model)	251.11		273.46		84.26		72.15		321.67		95.88	
R^2	0.0229		0.0086		0.0320		0.0378		0.0184		0.0212	

Note: Standard errors are in parentheses.

*Significant at .05 level.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

References for Appendix F

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APPENDIX G

1992 WORLDWIDE SURVEY QUESTIONNAIRE

RCS #DD-HA(AR) 1785

1992 DEPARTMENT OF DEFENSE SURVEY OF SUBSTANCE ABUSE AND HEALTH BEHAVIORS AMONG MILITARY PERSONNEL

HEALTH AFFAIRS

INTRODUCTION

Who are we? We are from Research Triangle Institute, a not-for-profit research company under contract to the Assistant Secretary of Defense—Health Affairs.

How were you selected? You were randomly selected to participate in this important survey.

Must you participate? Your participation in this survey is voluntary. We encourage you to answer all of the questions honestly, but you are not required to answer any question to which you object.

What are the questions about? Mainly about alcohol and drug abuse. There are a few other questions about tobacco use, health attitudes and behavior, and gambling behavior.

Who will see your answers? Only civilian researchers. No military personnel will see your answers. Your answers will be combined with those from other military personnel to prepare a statistical report. This questionnaire will be anonymous if you DO NOT WRITE YOUR NAME OR SOCIAL SECURITY NUMBER ANYWHERE ON THIS BOOKLET.

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, mark the circle for the one answer that best fits your situation.**

- **Use only the pencil you were given.**
- **Make heavy black marks that fill the circle for your answer.**

CORRECT MARK ● INCORRECT MARKS ⊘ ⊗ ◌ ✱

- **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 mark only one circle for your answer in the column below the question, as shown here:**

EXAMPLE: How would you describe your health?

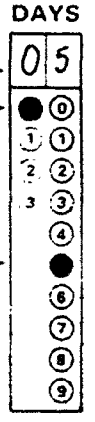
- ○ Excellent
- ● Good
- ○ Fair
- ○ Poor

- **If you are asked to give numbers for your answer, please complete the grid as shown below.**

EXAMPLE: During the past 30 days, how many full 24-hour days were you deployed at sea or in the field?

- *First, write your answer in the boxes. Use both boxes. Write ONE number in each box.*
- *Always write the last number in the right-hand box. Fill in any unused boxes with zeros.*

  For example, an answer of "5 days" would be written as "05."
- *Then, darken the matching circle below each box.*



- **Sometimes you will be asked to *"Darken one circle 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?

(Darken one circle on each line)

	Often	Sometimes	Never
Swim	●	○	○
Bowl	○	○	●
Play tennis	○	●	○

NOW PLEASE TURN THE PAGE AND BEGIN WITH QUESTION 1.

1. **What Service are you in?**

- ○ Army
- ○ Navy
- ○ Marine Corps
- ○ Air Force

2. **What is your pay grade?**

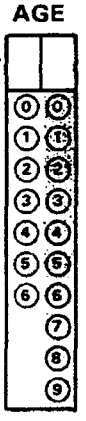
ENLISTED		OFFICER	
○ E-1	○ E-6	○ Trainee	○ O-4
○ E-2	○ E-7	○ W1-W4	○ O-5
○ E-3	○ E-8	○ O-1 or O-1E	○ O-6
○ E-4	○ E-9	○ O-2 or O-2E	○ O7-O10
○ E-5		○ O-3 or O-3E	

3. **What is your *highest* level of education now?**

- ○ Did not graduate from high school
- ○ GED or ABE certificate
- ○ High school graduate
- ○ 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

4. **How old were you on your last birthday?**

- ***First, enter your age in the boxes. Use both boxes. Write ONE number in each box.***
- ***Then, darken the matching circle below each box.***



5. **Are you male or female?**

- ○ Male
- ○ Female

6. **What is your marital status?**

- ○ Married or living as 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

If you are married or living as married, the term "spouse," as used in this questionnaire, refers to your wife or husband or to the person with whom you live as married.

7. **Is your spouse now living with you at your present duty location?**

- ○ Yes
- ○ No
- ○ I have no spouse

8. **Do you have any children living with you at your present duty location?**

- ○ Yes
- ○ No
- ○ I have no children

9. **Are you of Spanish/Hispanic origin or descent?**

- ○ No (not Spanish/Hispanic)
- ○ Yes, Mexican/Mexican-American/Chicano
- ○ Yes, Cuban
- ○ Yes, Central or South American
- ○ Yes, other Spanish/Hispanic

10. **Are you:**

- ○ American Indian/Alaskan Native
- ○ Black/Negro/Afro-American
- ○ Oriental/Asian/Chinese/Japanese/Korean/Filipino/Pacific Islander
- ○ White/Caucasian
- ○ Other

11. **Are you currently serving on a ship that is deployed?**

- ○ 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 from a civilian or that you personally own
- ○ On board ship
- ○ Military barracks/dormitory or bachelor quarters
- ○ On-base military family housing
- ○ Off-base military family housing

13. **How long did you serve in the Middle East as part of Operation Desert Shield/Desert Storm?**

- ○ Did not serve in Operation Desert Shield/Desert Storm
- ○ Served 1 month or less
- ○ Served 2-3 months
- ○ Served 4-6 months
- ○ Served more than 6 months

IF YOU ARE ENLISTED, PLEASE COMPLETE QUESTION 14.
IF YOU ARE AN OFFICER, PLEASE GO TO QUESTION 15.

14. (ENLISTED ONLY) Which one of the following categories best describes your military job?
(Darken only one circle.)

CATEGORY	EXAMPLES
○ Infantry, Gun Crew, or Seamanship Specialist	Individual weapons specialists, crew-served artillery specialists, armor and amphibious crewmen, 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, chaplains' 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 craftsmen
○ Service and Supply Handler	Personnel in food service, operation of motor transport, shipping and receiving, law enforcement, laundry and dry cleaning
○ Non-Occupational	Personnel serving in duties of a special or otherwise undesignated nature

(GO TO QUESTION 16)

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15. (OFFICERS ONLY) Which one of the following categories best describes your military job?
(Darken only one circle.)

○ General Officer or Executive
○ Tactical Operations Officer (such as pilots and crews and operations staff officers)
○ 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 (such as student, billet designator, and officer new to occupational field)

16. 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?

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS				
	3 or More	2	1	Never	Doesn't Apply
I had an illness that kept me from duty for a week or longer	○	○	○	○	○
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, or brig	○	○	○	○	○
I was hurt in an accident (any kind)	○	○	○	○	○
I caused an accident where someone else was hurt or property was damaged	○	○	○	○	○
I hit my spouse 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 wife or husband threatened to leave me	○	○	○	○	○
My wife or husband left me	○	○	○	○	○

17. 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?

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS				
	3 or More	2	1	Never	Doesn't Apply
I had heated arguments with family or friends	○	○	○	○	○
I had trouble on the job	○	○	○	○	○
I was involved in a motor vehicle accident while I was driving (regardless of who was responsible)	○	○	○	○	○
I had health problems	○	○	○	○	○
I drove unsafely	○	○	○	○	○
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)	○	○	○	○	○
I got into a loud argument in public	○	○	○	○	○

The next group of questions is about past and current use of alcoholic beverages — that is, beer, wine, and liquor. By "liquor," we mean whiskey, rum, gin, vodka, bourbon, scotch, tequila, or any other type of alcoholic beverage. Please take your time on these questions and answer each one as accurately as possible. 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.

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

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, 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 (½ liter)
- ○ Liter or quart (32-oz.) bottle or mug
- ○ 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

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

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 (like sherry, port, vermouth, brandy, Dubonnet, champagne, etc.)
- Wine cooler (such as California Cooler, 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 750 ml.)

- ○ 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 ½ 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 1½ ounces of liquor.)

- ○ 5 or more ounces
- ○ 4 ounces
- ○ 3 ounces (a "double")
- ○ 2 ounces
- ○ 1½ 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. 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.

(Darken one circle on each line)	Very Important	Fairly Important	Slightly Important	Not at All Important	Don't Drink
To be friendly or social	○	○	○	○	○
To forget my worries	○	○	○	○	○
To relax	○	○	○	○	○
To help cheer me up when I am in a bad mood	○	○	○	○	○
To help me when I am depressed or nervous	○	○	○	○	○
To help me when I am bored and have nothing to do	○	○	○	○	○
To increase my self-confidence	○	○	○	○	○
To get drunk or "high"	○	○	○	○	○

Now think about your use of beer, wine, or liquor over the past 12 months. The term "work day," 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.

28. The following statements describe some things connected with drinking that affect people on their work days. 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									
(Darken one circle on each line)	40 or More	21-39	12-20	7-11	4-6	3	2	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 or "high" while working because of drinking	○	○	○	○	○	○	○	○	○	○
I was called in during off-duty hours and reported to work feeling drunk or "high" from alcohol	○	○	○	○	○	○	○	○	○	○

29. For each statement below, please indicate how often you have had this experience during the past 12 months.

(Darken one circle on each line)	About Every Day	5-6 Days a Week	3-4 Days a Week	1-2 Days a Week	1-3 Days a Month	Less Often Than Monthly	Never	Don't Drink
My hands shook a lot after drinking the day before	○	○	○	○	○	○	○	○
I awakened unable to remember some of the things I had done while drinking the day before	○	○	○	○	○	○	○	○
I could not stop drinking before becoming drunk	○	○	○	○	○	○	○	○
I was sick because of drinking (nausea, vomiting, severe headaches, etc.)	○	○	○	○	○	○	○	○
I took a drink the first thing when I got up for the day	○	○	○	○	○	○	○	○
I had the "shakes" because of drinking	○	○	○	○	○	○	○	○
I got into a fight where I hit someone when I was drinking	○	○	○	○	○	○	○	○
I got drunk or very high from drinking	○	○	○	○	○	○	○	○

30. **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?**

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS				
	3 or More	2	1	Never	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 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 drinking	○	○	○	○	○
My drinking caused an accident where someone else was hurt or property was damaged	○	○	○	○	○
I got into a fight where I hit someone when I was drinking	○	○	○	○	○
My wife or husband threatened to leave me because of my drinking	○	○	○	○	○
My wife or husband left me because of my drinking	○	○	○	○	○
I had to be detoxified because of my drinking	○	○	○	○	○
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	○	○	○	○	○

The next three questions ask about beer, wine, and liquor separately. Select the one answer that best describes your drinking during the past 12 months — that is, since this time last year.

31. 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

32. During the past 12 months, how often did you drink 8 or more glasses of wine (more than a 750 ml 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

33. 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

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.

34. Please indicate how much you agree or disagree with each of the following statements.

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Drinking will interfere with my health or physical fitness	○	○	○	○	○
The number of social events at this installation where alcohol is available makes drinking easy	○	○	○	○	○
Disciplinary action will be taken against any person identified as having a drinking problem	○	○	○	○	○
Driving while intoxicated on-base at this installation is a sure way to get arrested	○	○	○	○	○
The military's alcohol education program has helped me make better decisions about drinking	○	○	○	○	○
Use of alcohol is against my religious beliefs	○	○	○	○	○
Seeking help for a drinking problem will damage one's military career	○	○	○	○	○
There are some times at work when I could use a drink	○	○	○	○	○
The heavy drinking I see reduces the military readiness of my unit	○	○	○	○	○
I have benefited from attending my Service's alcohol/drug prevention class	○	○	○	○	○

35. Since you joined the Service, have you received professional counseling or treatment for a drinking-related problem from any of the following sources?

(Darken one circle on each line)	Yes	No	Have Had No Problem	Don't Drink
Through a military clinic, hospital, or other military medical facility	○	○	○	○
Through a military counseling center or other military alcohol treatment or rehabilitation program	○	○	○	○
Through a civilian doctor, clinic, hospital, or other civilian medical facility	○	○	○	○
Through a civilian alcohol counselor, mental health center, or other civilian alcohol treatment or rehabilitation program	○	○	○	○

36. During the past 30 days, in what one kind of place did you drink most often?

- ○ My quarters or place of residence (including ships)
- ○ Enlisted, NCO, or officers' club
- ○ On-base quarters of friends
- ○ Off-base homes or residences of friends
- ○ Civilian bar, tavern, nightclub, or lounge
- ○ Restaurant or eating place
- ○ Driving around or sitting in a car
- ○ Out in the open, like at a sports event or picnic
- ○ None of the above
- ○ I haven't drunk in the past 30 days

37. How often do you drive a motor vehicle within 2 hours after drinking any amount of any alcoholic beverage (beer, wine, or liquor), regardless of whether you feel any effects from the alcohol?

- ○ All of the time
- ○ Most of the time
- ○ About half of the time
- ○ Some of the time
- ○ Hardly any of the time
- ○ Never
- ○ Don't drink
- ○ Don't drive

38. **Think about the days you worked during the past 30 days. How often did you have a drink 2 hours or less before going to work?**

- ◯ Every work day
- ◯ Most work days
- ◯ About half of my work days
- ◯ Several work days
- ◯ One or two work days
- ◯ Never in the past 30 days
- ◯ Don't drink

39. **On work days during the past 30 days, how often did you have a drink during your lunch break?** (Answer for the main meal that occurred during your usual duty hours.)

- ◯ Every work day
- ◯ Most work days
- ◯ About half of my work days
- ◯ Several work days
- ◯ One or two work days
- ◯ Never in the past 30 days
- ◯ Don't drink

40. **During the past 30 days, how often did you have a drink while you were working (on-the-job) or during a work break?**

- ◯ Every work day
- ◯ Most work days
- ◯ About half of my work days
- ◯ Several work days
- ◯ One or two work days
- ◯ Never in the past 30 days
- ◯ Don't drink

41. About how old were you when you first began to use alcohol once a month or more often?

- *First, enter the age in the boxes. Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*

AGE

0	0
1	1
2	2
3	3
4	4
5	5
6	6
	7
	8
	9

I have never used alcohol at least once a month

42. **Are you now drinking more, about the same, or less than you did before you entered the Service?**

- ◯ Drink more now
- ◯ Drink about the same
- ◯ Drink less now (but still drink)
- ◯ Drank before entering the Service but do not drink now
- ◯ Did not drink before entering the Service and do not drink now

43. **Are you now drinking more, about the same, or less than you did before you came to this installation?**

- ◯ Drink more at this installation
- ◯ Drink about the same
- ◯ Drink less at this installation (but still drink)
- ◯ Drank before coming to this installation but do not drink now
- ◯ Did not drink before coming to this installation and do not drink now

44. **Which of these statements best reflects your use of alcoholic beverages while you were serving in the Middle East as part of Operation Desert Shield/ Desert Storm?**

- ◯ My drinking increased
- ◯ My drinking stayed about the same while I was serving as part of Operation Desert Shield/ Desert Storm
- ◯ My drinking decreased
- ◯ Did not drink before or during service in Operation Desert Shield/Desert Storm
- ◯ Did not serve in Operation Desert Shield/ Desert Storm

45. **Are you now drinking more, about the same, or less than you did before you served in the Middle East as part of Operation Desert Shield/Desert Storm?**

- Drink more now
- Drink about the same
- Drink less now
- Did not drink before or during service in Operation Desert Shield/Desert Storm and do not drink now
- Did not serve in Operation Desert Shield/ Desert Storm

46 Since you joined the Service, have you ever attended an alcohol/drug prevention class?

- Yes
- No

47. Please indicate how much you agree or disagree with each of the following statements.

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Most of my friends drink	○	○	○	○	○
Drinking is part of being in the military	○	○	○	○	○
Persons who try to get treatment for alcohol problems will later experience surprise searches of themselves, their auto, or their quarters	○	○	○	○	○
My spouse or the person I date disapproves of my drinking (or would disapprove if I did drink)	○	○	○	○	○
Persons who want treatment for alcohol problems have difficulty getting off-duty to attend counseling sessions	○	○	○	○	○
Drinking is just about the only recreation available at this installation	○	○	○	○	○
My drinking sometimes interferes with my work	○	○	○	○	○
There is no way to get help for a drinking problem without one's commander finding out	○	○	○	○	○
At parties or social functions at this installation, everyone is encouraged to drink	○	○	○	○	○
Alcoholic beverages cost too much	○	○	○	○	○

Now we would like to ask some questions about cigarettes and other tobacco products.

48. Have you smoked at least 100 cigarettes in your entire life? (That would be 5 packs or more in your entire life.)

- ○ Yes
- ○ No

49. How old were you when you first started smoking cigarettes fairly regularly?

- *First, enter the age in the boxes. Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*

AGE

○0	○0
○1	○1
○2	○2
○3	○3
○4	○4
○5	○5
○6	○6
	○7
	○8
	○9

- ○ I have never smoked at least one cigarette a day for a week or longer

50. For how many years altogether have you smoked daily? (Do not count any time when you quit smoking.)

- *First, enter the number of years in the boxes. Use both boxes. ONE number to a box.*
- *If you have smoked regularly for less than 1 year, record "01."*
- *Then, darken the matching circle below each box.*

YEARS

○0	○0
○1	○1
○2	○2
○3	○3
○4	○4
○5	○5
	○6
	○7
	○8
	○9

- ○ I have never smoked at least one cigarette a day for a week or longer.

51. 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

52. **Think about the past <u>past 30 days</u>. How many cigarettes did you <u>usually</u> smoke on a typical day?**

- ○ About 3 or more packs a day (more than 55 cigarettes)
- ○ About 2½ packs a day (46-55 cigarettes)
- ○ About 2 packs a day (36-45 cigarettes)
- ○ About 1½ packs a day (26-35 cigarettes)
- ○ About 1 pack a day (16-25 cigarettes)
- ○ About ½ 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

53. **For about how many years have you smoked the number of cigarettes in question 52?**

- ***First, enter the number of years in the boxes. Use both boxes. Write ONE number in each box.***
- ***If you have smoked this much for less than 1 year, record "01."***
- ***Then, darken the matching circle below <u>each</u> box.***

YEARS

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

○ I did not smoke in the past 30 days, or I have never smoked cigarettes.

54. **During the <u>past 12 months</u>, have you made a serious attempt to stop smoking cigarettes; that is, did you go for at least a week without smoking?**

- ○ Yes
- ○ No
- ○ Didn't smoke cigarettes in the past 12 months
- ○ Never smoked cigarettes

55. **During the <u>past 12 months</u>, how often on the average have you smoked <u>cigars or a pipe</u>?**

- ○ 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 smoke cigars or pipe

56. **During the <u>past 12 months</u>, how often on the average have you used <u>chewing tobacco or snuff or other smokeless tobacco</u>?**

- ○ 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 use smokeless tobacco

57. **Which one of the following statements best reflects your use of cigarettes <u>while you were serving</u> in the Middle East as part of Operation Desert Shield/ Desert Storm?**

- ○ I started smoking regularly for the first time
- ○ I started smoking again, after having quit for 2 weeks or longer
- ○ My use of cigarettes increased
- ○ My use of cigarettes stayed about the same
- ○ My use of cigarettes decreased
- ○ Did not use cigarettes before or during Operation Desert Shield/Desert Storm
- ○ Did not serve in Operation Desert Shield/Desert Storm

58. **Are you <u>now</u> smoking cigarettes more, about the same, or less than you did before you served in the Middle East as part of Operation Desert Shield/ Desert Storm?**

- ○ Smoking more now
- ○ Smoking about the same
- ○ Smoking less now (but still smoking)
- ○ Quit smoking
- ○ Did not smoke cigarettes during service in Operation Desert Shield/Desert Storm and do not smoke now
- ○ Did not serve in Operation Desert Shield/Desert Storm

59. **Which one of these statements best reflects your use of <u>any</u> tobacco products since your Service's tobacco use policy took effect?**

- ○ Smoke at work (including work breaks)
- ○ Do not smoke at work but use smokeless tobacco products (chewing tobacco or snuff) when at work
- ○ Do not use tobacco products at work, but use tobacco products when not at work
- ○ Quit using tobacco products altogether
- ○ Did not use tobacco products before or after my Service's tobacco use policy took effect

60. **The following list includes some of the reasons people give for smoking cigarettes. Please tell us how important each reason is to you, for your smoking.**

(Darken one circle on each line)	Very Important	Fairly Important	Slightly Important	Not at All Important	Don't Smoke
To fit in with the group	○	○	○	○	○
To help me relax	○	○	○	○	○
To keep my weight down	○	○	○	○	○
To show that I'm "cool"	○	○	○	○	○
To show that I'm tough	○	○	○	○	○
To look and feel like an adult	○	○	○	○	○
To help me when I'm bored	○	○	○	○	○
To help me concentrate	○	○	○	○	○
To satisfy a craving	○	○	○	○	○
To help me handle stress	○	○	○	○	○
For the taste	○	○	○	○	○
For the enjoyment of it	○	○	○	○	○

61. **Please indicate how much you agree or disagree with each of the following statements.**

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Smoking will harm my health or physical fitness	○	○	○	○	○
The number of places to buy cigarettes at this installation makes it easy to smoke	○	○	○	○	○
Disciplinary action will be taken against any person violating my Service's tobacco use policy	○	○	○	○	○
Use of tobacco is against my religious beliefs	○	○	○	○	○
There are times at work when I could use a cigarette	○	○	○	○	○
Most of my friends smoke	○	○	○	○	○
Smoking is part of being in the military	○	○	○	○	○
My spouse 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	○	○	○	○	○
Smoking is a good way to relieve tension	○	○	○	○	○
Being around people who are smoking will harm my health	○	○	○	○	○

The following question refers to the use of anabolic steroids. Anabolic steroids are sometimes prescribed by doctors to promote healing from certain types of injuries. Some athletes, and others, use them to try to increase muscle development.

62. **How important has each of the following reasons been for your using anabolic steroids on your own, that is, without a doctor's orders?**

(Darken one circle on each line)	Very Important	Fairly Important	Slightly Important	Not at All Important	Don't Use Steroids
To speed up my recovery from an injury	○	○	○	○	○
To help prevent injury	○	○	○	○	○
To improve my athletic performance	○	○	○	○	○
To improve my physical appearance, such as to "bulk up"	○	○	○	○	○
To make me more aggressive	○	○	○	○	○
To make me stronger	○	○	○	○	○

The next set of [illegible] for non-medical purposes. First we list the types of drugs we are interested in, along with some of their most common trade and clinical names.

DRUG TYPES	COMMON TRADE/CLINICAL NAMES
Marijuana or Hashish	Cannabis, THC
PCP (alone or combined with other drugs)	Phencyclidine (PCP)
LSD and Other Hallucinogens	LSD, Mescaline, Peyote, DMT, Psilocybin
Cocaine	Cocaine (including "crack")
Amphetamines, Methamphetamines, and Other Stimulants	Ice, crystal meth, Preludin, Benzedrine, Biphetamine, Cylert, Desoxyn, Dextroamphetamine, Dexamyl, Dexedrine, Didrex, Eskatrol, Ionamin, Methedrine, Obedrin-LA, Plegine, Pondimin, Pre-Sate, Ritalin, Sanorex, Tenuate, Tepanil, Voranil
Tranquilizers and Other Depressants	Ativan, Meprobamate, Librium, Valium, Atarax, Benadryl, Equanil, Libritabs, Meprospan, Miltown, Serax, SK-Lygen, Thorazine, Tranxene, Verstran, Vistaril, Xanax
Barbiturates and Other Sedatives	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
Heroin and Other Opiates	Heroin, Morphine, Opium
Analgesics and Other Narcotics	Darvon, Demerol, Percodan, Tylenol with codeine, codeine, cough syrups with codeine, Dilaudid, Dolene, Dolophine, Leritine, Levo-Dromoran, Methadone, Propoxyphene, SK-65, Talwin
Inhalants	Lighter fluids, aerosol sprays like Pam, glue, toluene, amyl nitrite, gasoline, poppers, locker room odorizers, spray paints, paint thinner, halothane, ether or other anesthetics, nitrous oxide ("laughing gas"), correction fluids, cleaning fluids, degreasers
"Designer" drugs	These drugs, with names like "Ecstasy," "Adam," "Eve," are made by combining two or more, often legal, drugs or chemicals to produce drugs specifically for their mood-altering or psychoactive effects
Anabolic Steroids	Testosterone, Methyltestosterone, or other drugs taken to improve physical strength

Although some of the drugs listed above may be prescribed for medical reasons, the questions that follow refer to use of these drugs *for non-medical purposes*. By *non-medical 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*.

63. During the past 30 days, on about how many days did you use each of the following drugs for non-medical purposes?

(Darken one circle on each line)	28-30 Days	20-27 Days	11-19 Days	4-10 Days	1-3 Days	Never in Past 30 Days
Marijuana or hashish	○	○	○	○	○	○
PCP	○	○	○	○	○	○
LSD or other hallucinogens	○	○	○	○	○	○
Cocaine	○	○	○	○	○	○
Amphetamines or other stimulants	○	○	○	○	○	○
Tranquilizers or other depressants						
Barbiturates or other sedatives						
Heroin or other opiates						
Analgesics or other narcotics						
Inhalants						
"Designer" drugs ("Ecstasy," etc.)						
Anabolic steroids						

64. **The following statements describe some things connected with using drugs that affect people on their work days. Please indicate on how many work days in the past 12 months these things ever happened to you.**

(Darken one circle on each line)	NUMBER OF WORKS DAYS IN PAST 12 MONTHS									
	40 or More	21-39	12-20	7-11	4-6	3	2	1	None	Don't Use Drugs
I was late for work or left work early because of my drug use	○	○	○	○	○	○	○	○	○	○
I was hurt in an on-the-job accident because of my drug use	○	○	○	○	○	○	○	○	○	○
I worked below my normal level of performance because of my drug use	○	○	○	○	○	○	○	○	○	○
I did not come to work at all because of the aftereffects, an illness, or a personal accident caused by my drug use	○	○	○	○	○	○	○	○	○	○
I was "high" or "strung out" while working because of my drug use	○	○	○	○	○	○	○	○	○	○
I was called in during off-duty hours and reported to work feeling "high" or "strung out" from my drug use	○	○	○	○	○	○	○	○	○	○

65. **Please indicate how much you agree or disagree with each of the following statements.**

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
At parties or social functions at this installation, it's easy to get away with using drugs	○	○	○	○	○
There's always a party somewhere at or near this installation where drugs are being used	○	○	○	○	○
Education about drugs at this installation helps keep people from using drugs	○	○	○	○	○
The personnel at this installation sincerely try to help people who have a drug problem	○	○	○	○	○
Using drugs is just about the only recreation available at this installation	○	○	○	○	○

66. On the average, how often in the past 12 months have you taken each of the following drugs for non-medical purposes?

(Darken one circle on each line)	USED THIS TYPE OF DRUG IN PAST 12 MONTHS								
	Daily	3-6 Days a Week	1-2 Days a Week	25-51 Days Total	12-24 Days Total	6-11 Days Total	3-5 Days Total	1-2 Days Total	Never in Past Year
Marijuana or hashish	○	○	○	○	○	○	○	○	○
PCP	○	○	○	○	○	○	○	○	○
LSD or other hallucinogens	○	○	○	○	○	○	○	○	○
Cocaine	○	○	○	○	○	○	○	○	○
Amphetamines or other stimulants	○	○	○	○	○	○	○	○	○
Tranquilizers or other depressants	○	○	○	○	○	○	○	○	○
Barbiturates or other sedatives	○	○	○	○	○	○	○	○	○
Heroin or other opiates	○	○	○	○	○	○	○	○	○
Analgesics or other narcotics	○	○	○	○	○	○	○	○	○
Inhalants	○	○	○	○	○	○	○	○	○
"Designer" drugs ("Ecstasy," etc.)	○	○	○	○	○	○	○	○	○
Anabolic steroids	○	○	○	○	○	○	○	○	○

67. Here are some statements about things that happen to people while or after using drugs or because of using drugs. How many times in the past 12 months did each of the following happen to you?

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS				
	3 or More	2	1	Never	Don't Use Drugs
I was arrested for driving under the influence of drugs	○	○	○	○	○
I didn't get promoted because of my use of drugs	○	○	○	○	○
I received UCMJ punishment (Court Martial, Article 15, Captain's Mast, Office Hours) because of my use of drugs	○	○	○	○	○
I had an illness connected with my use of drugs that kept me from duty for a week or longer	○	○	○	○	○
I was arrested for a drug incident not related to driving	○	○	○	○	○
I spent time in jail, stockade, or brig because of my use of drugs	○	○	○	○	○
I was hurt in any kind of accident caused by my use of drugs	○	○	○	○	○
I got into a fight where I hit someone when I was using drugs	○	○	○	○	○
My wife or husband left me because of my use of drugs	○	○	○	○	○
I had to be detoxified because of my use of drugs	○	○	○	○	○
I came up positive on a drug urinalysis test	○	○	○	○	○

68. Please indicate how much you agree or disagree with each of the following statements.

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
The emphasis on detection and discipline in my Service's drug program hurts morale	○	○	○	○	○
Anyone detected using marijuana should be discharged	○	○	○	○	○
I am opposed to personnel in my Service using marijuana:					
At any time anywhere	○	○	○	○	○
Only if it affects their performance	○	○	○	○	○
Some people get away with using certain drugs because the urinalysis tests won't detect those drugs	○	○	○	○	○
The people I associate with off-duty think that I should not use marijuana (or would disapprove if I did use marijuana)	○	○	○	○	○
Some drug users I know stop or cut down their use when they think they may be selected for urinalysis testing	○	○	○	○	○
I would not use drugs even if there were no urinalysis testing	○	○	○	○	○
The military's urinalysis tests for drugs are reliable	○	○	○	○	○
I would be more inclined to use drugs if the military did not have urinalysis testing	○	○	○	○	○
People in my unit would be more inclined to use drugs if the military did not have urinalysis testing	○	○	○	○	○
Disciplinary action will be taken against any person identified as having a drug problem, even if no drugs are found	○	○	○	○	○
Seeking help for a drug problem will damage one's military career	○	○	○	○	○
I might use (more) marijuana if it were easier to get	○	○	○	○	○

69. The statements below are about some other things that happen to people because of using drugs for non-medical purposes. How many times in the past 12 months did each of the following happen to you?

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS				
	3 or More	2	1	Never	Don't Use Drugs
I had trouble on the job because of my use of drugs	○	○	○	○	○
I had heated arguments with family or friends because of my use of drugs	○	○	○	○	○
I was involved in a motor vehicle accident while I was driving after using drugs (regardless of who was responsible)	○	○	○	○	○
I had health problems because of my use of drugs	○	○	○	○	○
I drove unsafely because of my use of drugs	○	○	○	○	○
My using drugs interfered with my family responsibilities	○	○	○	○	○
I had serious money problems because of my use of drugs	○	○	○	○	○
I had trouble with the police (civilian or military) because of my use of drugs	○	○	○	○	○
I found it harder to handle my problems because of my use of drugs	○	○	○	○	○
I got into a loud argument in public because of my use of drugs	○	○	○	○	○
A relative or friend told me that I should cut down on my use of drugs	○	○	○	○	○

70. When did you last use each type of drug listed below for non-medical purposes?

(Darken one circle on each line)	LAST USED THIS TYPE OF DRUG							
	Today	1-30 Days Ago	5-8 Weeks Ago	2-3 Months Ago	4-6 Months Ago	7-12 Months Ago	More Than 1 Year Ago	Never Used
Marijuana or hashish	○	○	○	○	○	○	○	○
PCP	○	○	○	○	○	○	○	○
LSD or other hallucinogens	○	○	○	○	○	○	○	○
Cocaine	○	○	○	○	○	○	○	○
Amphetamines or other stimulants	○	○	○	○	○	○	○	○
Tranquilizers or other depressants	○	○	○	○	○	○	○	○
Barbiturates or other sedatives	○	○	○	○	○	○	○	○
Heroin or other opiates	○	○	○	○	○	○	○	○
Analgesics or other narcotics	○	○	○	○	○	○	○	○
Inhalants	○	○	○	○	○	○	○	○
"Designer" drugs ("Ecstasy," etc.)	○	○	○	○	○	○	○	○
Anabolic steroids	○	○	○	○	○	○	○	○

71. Which one of these statements best reflects your use of drugs for non-medical purposes while you were serving in the Middle East as part of Operation Desert Shield/Desert Storm?

- ○ My use of drugs increased
- ○ My use of drugs stayed about the same
- ○ My use of drugs decreased
- ○ Did not use drugs before or during service in Operation Desert Shield/Desert Storm
- ○ Did not serve in Operation Desert Shield/Desert Storm

72. Are you now using drugs more, about the same, or less than you did before you served in the Middle East as part of Operation Desert Shield/Desert Storm?

- ○ Using drugs more now
- ○ Using drugs about the same
- ○ Using drugs less now
- ○ Did not use drugs before or during service in Operation Desert Shield/Desert Storm
- ○ Did not serve in Operation Desert Shield/Desert Storm

73. Since you joined the Service, have you received professional counseling or treatment for a drug-related problem from any of the following sources?

(Darken one circle on each line)	Yes	No	Have Had No Problem	Don't Use Drugs
Through military clinic, hospital, or other military medical facility	○	○	○	○
Through a military drug counseling center or other military drug treatment or rehabilitation program	○	○	○	○
Through a civilian doctor, clinic, hospital, or other civilian medical facility	○	○	○	○
Through a civilian drug counselor, mental health center, or other civilian drug treatment or rehabilitation program	○	○	○	○

74. Please indicate how much you agree or disagree with each of the following statements.

(Darken one circle on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Most of my friends use drugs, at least marijuana	○	○	○	○	○
There are some times at work when I could use an "upper"	○	○	○	○	○
Using drugs would interfere with my health or physical fitness	○	○	○	○	○
Using drugs would mess up my mind	○	○	○	○	○
Persons who try to get treatment for drug problems will later experience surprise searches of themselves, their auto, or their quarters	○	○	○	○	○
My spouse or the person I date disapproves of my using drugs (or would disapprove if I did use drugs)	○	○	○	○	○
Persons who want treatment for their drug problems have difficulty getting off duty to attend counseling sessions	○	○	○	○	○
Using drugs would interfere with my work	○	○	○	○	○
There is no way to get help for a drug problem without one's commander finding out	○	○	○	○	○
I favor being able to use marijuana when I'm off-duty	○	○	○	○	○

The next set of questions deals mainly with your use of health services, your health attitudes, and your health behavior.

75. During the past 12 months, how much stress did you experience at work or while carrying out your military duties?

- ○ A great deal
- ○ A fairly large amount
- ○ Some
- ○ A little
- ○ None at all

76. During the past 12 months, how much stress did you experience in your family life or in a relationship with a person you live with or date seriously?

- ○ A great deal
- ○ A fairly large amount
- ○ Some
- ○ A little
- ○ None at all

77. In the past 12 months, how many times were you ...

(Darken one circle on each line)	NUMBER OF TIMES IN PAST 12 MONTHS								
	40 or More	21-39	12-20	7-11	4-6	3	2	1	None
Seen as a patient in a hospital emergency room?	○	○	○	○	○	○	○	○	○
Admitted to a hospital or similar facility for a stay of at least 1 night?	○	○	○	○	○	○	○	○	○
Hospitalized for a week or longer?	○	○	○	○	○	○	○	○	○
Seen as an outpatient by a general medical doctor at a military facility?	○	○	○	○	○	○	○	○	○
Seen as an outpatient by a general medical doctor at a civilian facility?	○	○	○	○	○	○	○	○	○
Seen as an outpatient by a medical specialist (either military or civilian)?	○	○	○	○	○	○	○	○	○
Sick with symptoms such as runny nose or eyes, feeling flushed or sweaty, chills, nausea or vomiting, stomach cramps, diarrhea, muscle pains, or severe headaches?	○	○	○	○	○	○	○	○	○

78. Now think about any overnight hospital stays you may have had in the past 12 months. Did you have any overnight hospital stay in the past 12 months for the purpose of ...

(Darken one circle on each line)	Yes	No	Wasn't Hospitalized
Diagnostic tests?	○	○	○
Treatment of a physical illness?	○	○	○
Treatment of an injury?	○	○	○
Delivery of a baby?	○	○	○
Surgery?	○	○	○
Treatment of a psychiatric problem?	○	○	○
Treatment of substance abuse?	○	○	○
Treatment of a sexually transmitted disease (STD)?	○	○	○

79. In the past 12 months, did you visit a doctor for ...

(Darken one circle on each line)	Yes	No	Had No Doctor Visits
A routine checkup or physical?	○	○	○
Treatment of a physical illness or condition?	○	○	○
Treatment of an injury or follow-up after an injury?	○	○	○
Medical care for yourself before or after delivery of a baby?	○	○	○
Outpatient surgery or follow-up after any surgery?	○	○	○
Mental health services or counseling?	○	○	○
Substance abuse treatment or counseling?	○	○	○
Treatment of a sexually transmitted disease (STD), or counseling about STDs?	○	○	○

80. During the past 12 months, did you participate at least once in any of the following activities at your worksite or at a military health facility?

(Darken one circle on each line)	Yes	No	Don't Know
Blood pressure check	○	○	○
Cholesterol check	○	○	○
Personal fitness assessment (not including the annual required PFT)	○	○	○
Health Risk Appraisal (HRA)	○	○	○
Stop smoking class	○	○	○
Nutrition education class or counseling session	○	○	○
Back injury prevention class	○	○	○
Cancer prevention/awareness class	○	○	○
Stress management class	○	○	○
Sexually transmitted disease (STD) education or counseling session	○	○	○

81. During the past 12 months, have you made any changes in your health habits or behavior as a result of participating in any of the following activities?

(Darken one circle on each line)	Yes	No	Did Not Receive/ Participate in
Blood pressure check	○	○	○
Cholesterol check	○	○	○
Personal fitness assessment (not including the annual required PFT)	○	○	○
Health Risk Appraisal (HRA)	○	○	○
Stop smoking class	○	○	○
Nutrition education class or counseling session	○	○	○
Back injury prevention class	○	○	○
Cancer prevention/awareness class	○	○	○
Stress management class	○	○	○
Sexually transmitted disease (STD) education or counseling session	○	○	○

82. How much do you think people risk harming their health if ...

(Darken one circle on each line)	No Risk	Slight Risk	Moderate Risk	Great Risk
Their blood cholesterol level is high?	○	○	○	○
They have high blood pressure?	○	○	○	○
They are overweight?	○	○	○	○
They smoke cigarettes?	○	○	○	○
They have difficulty managing stress?	○	○	○	○
They do not exercise regularly?	○	○	○	○
They do not eat a balanced diet?	○	○	○	○
They have sex without using a condom with someone they do not know well?	○	○	○	○

83. During the past 12 months, were you ever told by a health professional that ...

(Darken one circle on each line)	Yes	No	Can't Remember
Your blood cholesterol level was high?	○	○	○
You had high blood pressure?	○	○	○
You needed to lose weight?	○	○	○
You needed to quit smoking?	○	○	○
You needed to change the way you manage stress?	○	○	○
You were not maintaining an adequate exercise program?	○	○	○
You needed to change your eating habits?	○	○	○
You needed to change your sexual behavior?	○	○	○

84. Please indicate whether you think each of the following statements is true or false, or if you don't know whether a statement is true or false.

(Darken one circle on each line)	True	False	Don't Know
AIDS can reduce the body's natural protection against disease	○	○	○
AIDS can damage the brain	○	○	○
AIDS is an infectious disease caused by a virus	○	○	○
A person can be infected with the AIDS virus and not have the disease AIDS	○	○	○
ANY person with the AIDS virus can pass it on to someone else through sexual intercourse	○	○	○
A pregnant woman who has the AIDS virus can give it to her baby	○	○	○
A person who has the AIDS virus can look and feel well and healthy	○	○	○
There are drugs available which can lengthen the life of a person infected with the AIDS virus	○	○	○
Early treatment of the AIDS virus infection can reduce symptoms in an infected person	○	○	○
There is a vaccine available to the public that protects a person from getting the AIDS virus	○	○	○
There is no cure for AIDS at present	○	○	○
Natural membrane condoms and latex condoms are equally good at preventing transmission of the AIDS virus	○	○	○

85. How likely do you think it is that a person will get AIDS or the AIDS virus infection from ...

(Darken one circle on each line)	Very Likely	Somewhat Likely	Somewhat Unlikely	Very Unlikely	Definitely Not Possible	Don't Know
Working with someone with the AIDS virus?	○	○	○	○	○	○
Eating in a restaurant or dining facility where the cook has the AIDS virus?	○	○	○	○	○	○
Sharing plates, forks, or glasses with someone who has the AIDS virus?	○	○	○	○	○	○
Using public toilets?	○	○	○	○	○	○
Sharing needles for drug use with someone who has the AIDS virus?	○	○	○	○	○	○
Being coughed at or sneezed on by someone who has the AIDS virus?	○	○	○	○	○	○
Mosquitoes or other insects?	○	○	○	○	○	○
Being cared for by a nurse, doctor, dentist, or other health-care worker who has the AIDS virus?	○	○	○	○	○	○
Getting a blood transfusion, that is, receiving blood donated by someone else?	○	○	○	○	○	○

86. What kind of condom do you or your partner usually use when you have sex?

- ○ Latex condom
- ○ Natural membrane condom (e.g., lambskin)
- ○ Use a condom, but don't know what it's made of
- ○ Do not use a condom
- ○ Have never had sex

87. The last time you had sex, what kind of condom did you or your partner use?

- ○ Latex condom
- ○ Natural membrane condom (e.g., lambskin)
- ○ Used a condom, but don't know what it was made of
- ○ Did not use a condom
- ○ Have never had sex

88. During the past 30 days, how often did you do each of the following?

(Darken one circle on each line)

	About Every Day	5-6 Days a Week	3-4 Days a Week	1-2 Days a Week	1-3 Days a Month	Less Often Than Monthly	Never
Run, jog, bicycle, or briskly walk or hike for 20 minutes or more	○	○	○	○	○	○	○
Eat at least two full meals in one day (count breakfast, if eaten)	○	○	○	○	○	○	○
Engage for 20 minutes or more in other strenuous physical activity (e.g., handball, soccer, racquet sports, swimming laps)	○	○	○	○	○	○	○
Eat breakfast	○	○	○	○	○	○	○
Get more than six consecutive hours of sleep in one day	○	○	○	○	○	○	○
Engage in mild physical activity (e.g., baseball, bowling, volleyball, other sports) more for the recreation than for the exercise	○	○	○	○	○	○	○

89. How often do you usually eat or drink the following kinds of foods?

(Darken one circle on each line)

	Daily	Several Times a Week	Once or Twice a Week	Less than Once a Week
Low-fat dairy products, such as low-fat milk or yogurt?	○	○	○	○
Hot dogs, hamburgers, bacon, sausage, or lunch meats?	○	○	○	○
High-fiber grains, such as whole wheat breads, oatmeal, or bran cereal?	○	○	○	○
Fruits, such as apples, oranges, or raisins?	○	○	○	○
High-fat dairy products, such as whole milk, cream, cheese, or ice cream?	○	○	○	○
Green or yellow vegetables, such as broccoli, peas, corn, or cabbage?	○	○	○	○
Eggs or egg dishes, such as quiche, omelettes, or egg salad?	○	○	○	○
Fried foods, such as French fries, fried chicken, or fried fish?	○	○	○	○

90. When you feel pressured, stressed, depressed, or anxious, how often do you engage in each of the following activities?

(Darken one circle on each line)

	Frequently	Sometimes	Rarely	Never
Meditate or just sit quietly	○	○	○	○
Talk to a friend or family member	○	○	○	○
Take prescribed medication	○	○	○	○
Just think about things a lot	○	○	○	○
Seek professional help	○	○	○	○
Light up a cigarette	○	○	○	○
Have a drink	○	○	○	○
Exercise or play sports	○	○	○	○
Get something to eat	○	○	○	○
Smoke marijuana or use other illegal drugs	○	○	○	○
Think of a plan to solve the problem	○	○	○	○
Take a nap	○	○	○	○
Buy something new	○	○	○	○
Think about hurting yourself or killing yourself	○	○	○	○
Get a headache or otherwise feel ill	○	○	○	○
Read or work on a hobby	○	○	○	○
Watch TV or listen to music	○	○	○	○

91. In the past 12 months, have you taken any of the following actions to improve your health?

(Darken one circle on each line)

	Yes	No	Doesn't Apply
Diet to lose weight	○	○	
Cut down on salt or sodium in your diet	○	○	
Exercise	○	○	
Stop smoking	○	○	○
Cut down on your use of alcohol	○	○	○

The following question deals with gambling, placing bets or playing games for money. This would include buying lottery tickets or taking part in a sports pool.

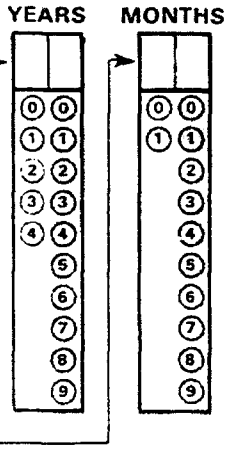
92. The following statements describe some things connected with placing bets or gambling that happen to people. Please indicate whether any of these things has ever happened to you.

(Darken one circle on each line)	Yes	No
You found yourself more and more preoccupied with gambling	○	○
You needed to gamble with more and more money to achieve the excitement you desired	○	○
You felt restless or irritable when you were unable to gamble, or when you tried not to gamble	○	○
You found yourself gambling to escape from problems	○	○
After losing money gambling, you went back another day to win back your money	○	○
You lied to your family, employer, or other important people in your life to hide the extent of your gambling	○	○
You jeopardized or lost relationships, school, a job, or career opportunities because of gambling	○	○
Someone provided you with money to relieve a desperate financial situation caused by gambling	○	○

The last set of questions deals mainly with your length of service and recent duty assignments.

93. 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.

- *First, enter the number of years in the "Years" boxes. Use both boxes. Write ONE number in each box.*
- *If you have been on active duty for less than a year, enter "00" in the "Years" boxes.*
- *Next, enter the number of remaining months (less than 12) in the "Months" boxes. Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*



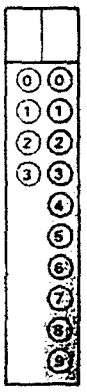
94. As of today, how many months have you been assigned to your present permanent post, base, ship, or duty station? (Include any extension of your present tour. Do not count previous tours at this duty station.)

- ○ 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

95. **During the past 30 days, how many days were you on official leave?** (Do not include overnight pass, 3-day pass, shore leave, or liberty.)

- *Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*

DAYS

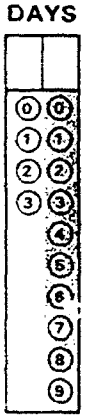


○ I had no official leave in the past 30 days.

96. **During the past 30 days, how many full 24-hour days were you deployed at sea or in the field?**

- *Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*

DAYS

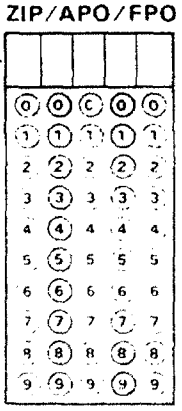


○ I was not deployed in the past 30 days.

97. 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?

- *First, enter the ZIP/APO/FPO number in the boxes. Use all five boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box*

ZIP/APO/FPO



98. **All in all, how satisfied or dissatisfied are you with your work assignment?**

○ Very satisfied
○ Satisfied
○ Dissatisfied
○ Very dissatisfied

99. **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

100. **When was the last time you were deployed at sea or in the field for 24 hours or more?**

○ Never deployed at sea or in the field
○ 1-7 days ago
○ 8-13 days ago
○ 2-4 weeks ago
○ 5-7 weeks ago
○ 2-3 months ago
○ 4-6 months ago
○ 7-12 months ago
○ More than 1 year ago

THANK YOU VERY MUCH FOR YOUR TIME, EFFORT, AND COOPERATION IN COMPLETING THIS QUESTIONNAIRE.

PLEASE PLACE THE QUESTIONNAIRE IN THE BOX AS YOU LEAVE THE ROOM.