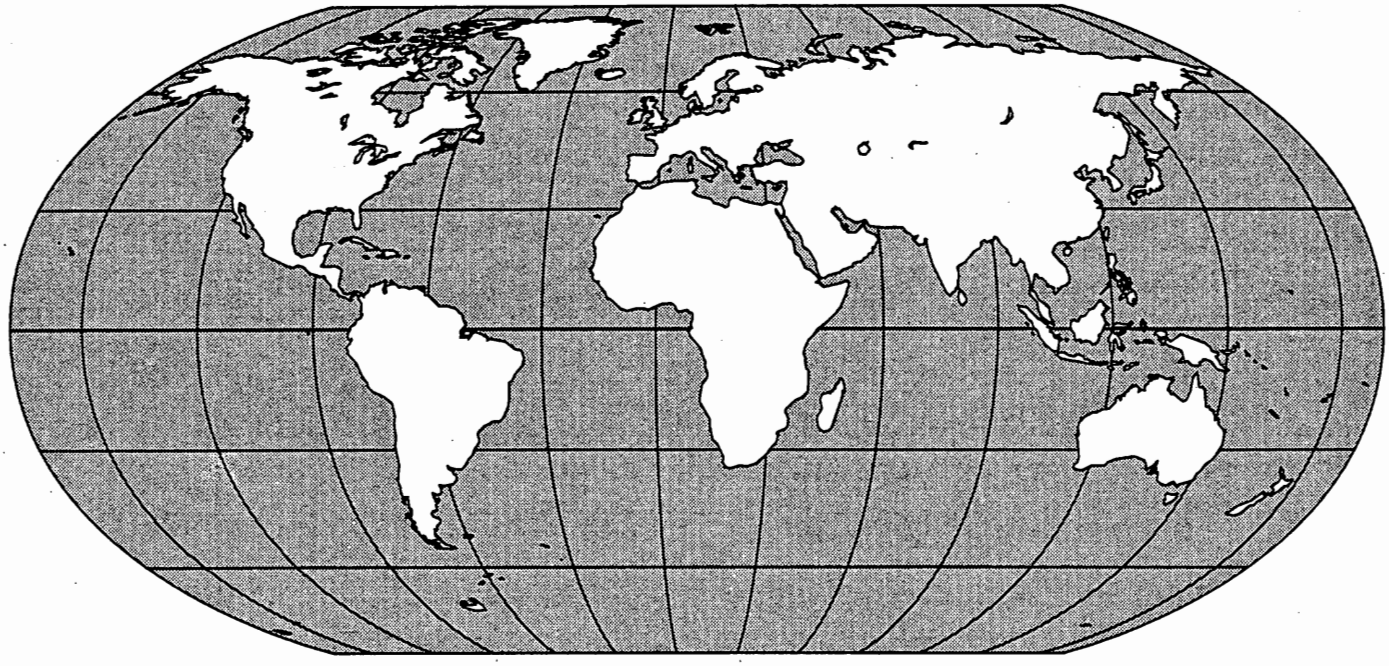
1995 Department of Defense Survey of Health Related Behaviors Among Military Personnel



Robert M. Bray
Larry A. Kroutil
Sara C. Wheeless
Mary Ellen Marsden
Susan L. Bailey
John A. Fairbank
Thomas C. Harford

Research Triangle Institute RTI/6019/06-FR December 1995

II-796

1995 Department of Defense Survey of Health Related Behaviors Among Military Personnel

Robert M. Bray
Larry A. Kroutil
Sara C. Wheeless
Mary Ellen Marsden
Susan L. Bailey
John A. Fairbank
Thomas C. Harford

This report has been prepared for the Assistant Secretary of Defense (Health Affairs) under Contract Number DASWO1-94-C-0140 by the Research Triangle Institute, P.O. Box 12194, Research Triangle Park, North Carolina 27709 (Phone: 919-541-6000). Robert M. Bray, Ph.D., served as Project Director.

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

PREFACE AND ACKNOWLEDGMENTS

The 1995 Department of Defense (DoD) Survey of Health Related Behaviors Among Military Personnel was conducted by the Research Triangle Institute (RTI) under the sponsorship of the Office of the Assistant Secretary of Defense (Health Affairs). The survey is the sixth in a series of DoD surveys conducted since 1980 and has two broad aims: (a) to continue the survey of substance use among active-duty military personnel, and (b) to establish baseline data to assess progress toward selected *Healthy People 2000* objectives for active-duty military personnel. As such, it provides comprehensive and detailed estimates of the prevalence of alcohol, illicit drug, and tobacco use and the negative effects of alcohol use. It also provides estimates for health behaviors pertaining to fitness and cardiovascular disease risk reduction, injuries and injury prevention, sexually transmitted disease risk reduction, cervical cancer screening, and maternal and infant health. In addition, it offers an assessment of the mental health of military personnel, including stress and depression, and examines the special health needs of military women.

Many individuals contributed to the success of this study. Among DoD and military Services personnel, special appreciation is due Navy Captain William M. Butler, the Contracting Officer's Representative, who provided valuable guidance throughout the study. Excellent liaison between DoD, RTI, and the Services was provided by Dr. Wanda Kuehr for the Army, Lieutenant Pedro Guzman for the Navy, Major Loxie Williams for the Marine Corps, and Colonel James Dale for the Air Force. We also gratefully acknowledge the efforts of the Defense Manpower Data Center, which provided sampling frame data, and the four Service centers, which 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.

Dr. Daniel Melnick of the Substance Abuse and Mental Health Services Administration, Office of Applied Studies, provided access to the data from the 1994 National Household Survey on Drug Abuse. Under subcontract to DoD, the National Computer Systems printed the questionnaires, and under subcontract to RTI, Mr. B. Steven Davis and the staff of the Information Services Group (ISG) assisted with the production and scoring of questionnaires. ISG staff shipped, received, and optically scanned the survey questionnaires and constructed the raw data file for the analysis.

Many RTI staff members in addition to the report authors contributed significantly to the success of this project by composing the questionnaire, constructing the sampling frames for the Services, coordinating data collection activities, tabulating data, completing various data-processing tasks, and editing and typing the manuscript. In particular, S. Randall Keesling led the data collection task and was assisted by Matthew W. Rueckert, who coordinated day-to-day activities with the field sites; L. Lynn Guess led the effort to develop the 1995 questionnaire; Gayle S. Bieler and Bruce Jones helped with the sampling frame construction; Dr. Robert E. Mason provided statistical support; and Yu Lou, Jill Kavee, and Marlee Moore-Gurrera assisted with data analysis, table production, graphics production, and report preparation. J. Valley Rachal, Director of the Social and Behavioral Research Center, 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 Richard S. Straw, who edited and proofread the report, and to Brenda K. Porter, Linda B. Fonville, and Catherine A. Boykin, who completed the enormous typing and clerical requirements.

Robert M. Bray, Ph.D.
Project Director

CONTENTS

Chapter		Page
	Preface and Acknowledgments	iii
	Tables	x
	Figures	xii
	EXECUTIVE SUMMARY	ES-1
1.	INTRODUCTION AND BACKGROUND	1-1
	1.1 Organization of the Report	1-1
	1.2 Health Promotion and the Military	1-3
	1.2.1 Background and Relevance	1-3
	1.2.2 DoD Health Promotion Policies	1-4
	1.2.3 *Healthy People 2000* and the Military	1-7
	1.3 DoD Survey Series	1-10
	1.4 Overview and Objectives of the 1995 DoD Survey	1-11
	1.5 Prior Studies on Substance Use Among the Military and Civilian Populations	1-13
	1.5.1 Military Population Studies	1-13
	1.5.2 Civilian Population Studies	1-15
	1.5.3 Comparisons Between the Military and Civilian Populations	1-16
	1.5.4 Summary	1-17
	1.6 Prior Studies on Other Health Behaviors Among the Military and Civilian Populations	1-18
	1.6.1 Military Population Studies	1-19
	1.6.2 Civilian Population Studies	1-20
	1.6.3 Summary	1-23
	1.7 Mental Health, Stress, and Coping	1-23
2.	**METHODOLOGY OF THE 1995 DoD SURVEY**	2-1
	2.1 Sampling Design Overview	2-1
	2.1.1 Phase 1 Design	2-2
	2.1.2 Phase 2 Design	2-3
	2.2 Instrumentation and Data Collection Procedures	2-3
	2.2.1 Survey Questionnaire	2-3
	2.2.2 Phase 1 Data Collection	2-4
	2.2.3 Phase 2 Data Collection	2-6
	2.3 Survey Performance Rates	2-7
	2.3.1 Eligibility Rate	2-7
	2.3.2 Availability Rate	2-7
	2.3.3 Completion Rate	2-9
	2.3.4 Response Rate Among Eligibles	2-9
	2.4 Sample Participants and Military Population Characteristics	2-9
	2.5 Key Definitions and Measures	2-12
	2.5.1 Demographic Characteristics	2-12
	2.5.2 Reference Periods	2-14
	2.5.3 Substance Use Measures	2-15
	2.5.4 Other Health Behaviors	2-17
	2.5.5 Mental Health	2-18
	2.6 Analytical Approach	2-18

CONTENTS (continued)

Chapter		Page
	2.7 Variability and Suppression of Estimates	2-20
	2.8 Strengths and Limitations of the Data	2-21
3.	**OVERVIEW OF TRENDS IN SUBSTANCE USE AND BASELINE MEASURES FOR *HEALTHY PEOPLE 2000* OBJECTIVES**	3-1
	3.1 Trends in Substance Use	3-1
	3.1.1 Unadjusted Trends in Substance Use	3-1
	3.1.2 Trends in Substance Use Adjusted for Sociodemographic Differences	3-4
	3.1.3 Trends in Alcohol-Related Negative Effects	3-7
	3.2 Baseline Measures for *Healthy People 2000* Objectives	3-8
	3.2.1 Smokeless Tobacco Use (Objective 1)	3-9
	3.2.2 Overweight (Objective 2)	3-9
	3.2.3 Exercise (Objective 3)	3-11
	3.2.4 Blood Pressure (Objectives 4 and 5)	3-11
	3.2.5 Cholesterol (Objective 6)	3-12
	3.2.6 Injuries and Injury Prevention (Objective 7)	3-12
	3.2.7 Seat Belt Use (Objective 8)	3-12
	3.2.8 Helmet Use (Objective 9)	3-13
	3.2.9 Condom Use (Objective 10)	3-13
	3.2.10 Pap Tests (Objective 11)	3-14
	3.2.11 Substance Use During Pregnancy (Objective 12)	3-14
	3.2.12 Status in Meeting *Healthy People 2000* Objectives	3-14
	3.3 Summary	3-16
4.	**ALCOHOL USE**	4-1
	4.1 Trends in Alcohol Use	4-1
	4.1.1 Average Daily Ounces of Alcohol	4-1
	4.1.2 Heavy Alcohol Use	4-3
	4.2 Service Comparisons of Alcohol Use	4-6
	4.2.1 Unadjusted Estimates	4-6
	4.2.2 Adjusted Estimates	4-7
	4.3 Correlates of Heavy Alcohol Use	4-9
	4.4 Negative Effects of Alcohol Use	4-11
	4.4.1 Trends in Negative Effects	4-11
	4.4.2 Pay Grade Differences	4-12
	4.4.3 Drinking Levels and Serious Consequences	4-15
	4.5 Participation in Counseling and Treatment Programs	4-16
	4.6 Military and Civilian Comparisons	4-18
	4.7 Summary	4-20
5.	**ILLICIT DRUG USE**	5-1
	5.1 Trends in Illicit Drug Use	5-1
	5.2 Service Comparisons of Illicit Drug Use	5-3
	5.2.1 Unadjusted Estimates	5-3
	5.2.2 Adjusted Estimates	5-5

CONTENTS (continued)

Chapter		Page
	5.3 Prevalence of Specific Drug Use in 1995	5-5
	5.4 Correlates of Illicit Drug Use	5-7
	5.5 Illicit Drug Use and Productivity Loss	5-9
	5.6 Comparisons with Civilian Population	5-11
	5.7 Summary	5-13
6.	**TOBACCO USE**	6-1
	6.1 Cigarette Use	6-1
	6.1.1 Trends in Cigarette Use, by Service	6-1
	6.1.2 Adjustments for Sociodemographic Differences in 1995	6-3
	6.1.3 Correlates of Cigarette Use	6-6
	6.1.4 Cigarette Use and Productivity Loss	6-9
	6.1.5 Attempts to Stop Smoking	6-9
	6.1.6 Comparisons of Cigarette Use in the Military and Civilian Populations	6-11
	6.2 Smokeless Tobacco Use	6-15
	6.2.1 Prevalence of Use, by Service	6-15
	6.2.2 Adjustments for Sociodemographic Differences	6-16
	6.3 Cigar and Pipe Use	6-18
	6.4 Summary	6-18
7.	**HEALTH BEHAVIOR AND HEALTH PROMOTION**	7-1
	7.1 Cardiovascular Disease Risk Reduction	7-1
	7.1.1 Overweight and Exercise	7-2
	7.1.2 Blood Pressure	7-5
	7.1.2.1 Blood Pressure Checks and Awareness	7-5
	7.1.2.2 High Blood Pressure Screening and Awareness	7-9
	7.1.2.3 Blood Pressure Advice or Interventions	7-11
	7.1.2.4 Actions to Control High Blood Pressure	7-14
	7.1.3 Cholesterol	7-16
	7.2 Injuries and Injury Prevention	7-20
	7.2.1 Prevalence of Injuries	7-21
	7.2.2 Seat Belt Use	7-23
	7.2.3 Helmet Use	7-25
	7.3 Sexually Transmitted Disease Risk Reduction	7-27
	7.3.1 Prevalence of Sexual Activity and Sexually Transmitted Disease	7-27
	7.3.2 Condom Use	7-29
	7.3.3 Knowledge and Beliefs About AIDS	7-33
	7.4 Summary	7-37
8.	**MENTAL HEALTH, STRESS, AND COPING**	8-1
	8.1 Appraisal of Stress	8-1
	8.2 Specific Sources of Stress	8-2
	8.3 Stress and Productivity Loss	8-4

CONTENTS (continued)

Chapter		Page
	8.4 Screening for Depression	8-6
	8.5 Coping with Stress and Depressive Symptoms	8-8
	8.6 Alcohol Use, Stress, and Mental Health	8-9
	8.7 Summary	8-11
9.0	**HEALTH ISSUES AMONG WOMEN IN THE MILITARY**	9-1
	9.1 Stress Among Military Women	9-1
	9.2 Perceived Quality of OB/GYN Care	9-3
	9.3 Cervical Cancer Risk Reduction	9-6
	9.4 Maternal and Infant Health	9-8
	9.4.1 Pregnancy and Use of Prenatal Care Services	9-8
	9.4.2 Alcohol and Cigarette Use During Pregnancy	9-9
	9.5 Summary	9-12
	REFERENCES	R-1

Appendix		
A	Sampling Design	A-1
B	Sample Weighting and Estimation Procedures	B-1
C	Estimated Sampling Errors	C-1
D	Supplemental Tables	D-1
E	Calculation of Alcohol Summary Measures	E-1
F	Technical Discussion of Standardization Approach and Multivariate Analyses	F-1
G	Comparisons of Alcohol Drinking Levels Based on Two Estimation Procedures	G-1
H	1995 DoD Survey Questionnaire	H-1

List of Tables

Table		Page
2.1	Survey Response Data and Performance Rates	2-8
2.2	Distribution of 1995 Survey Respondents, by Region and Pay Grade	2-10
2.3	Distribution of 1995 Respondents, by Sociodemographic Characteristics	2-11
2.4	Sociodemographic Characteristics of Eligible Respondent Population	2-13
3.1	Substance Use Summary for Total DoD, 1980-1995	3-3
3.2	Trends in Substance Use, Past 30 Days, Unadjusted and Adjusted by Sociodemographic Characteristics for Total DoD	3-6
3.3	Baseline Measures for *Healthy People 2000* Objectives, Total DoD, 1995	3-10
3.4	Baseline Measures for *Healthy People 2000* Objectives for Military Women, Total DoD, 1995	3-15
4.1	Trends in Average Daily Ounces of Ethanol Consumed, Past 30 Days, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1995	4-2
4.2	Trends in Heavy Alcohol Use, Past 30 Days, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1995	4-4
4.3	Estimates of Alcohol Use, Unadjusted and Adjusted for Sociodemographic Differences, by Service, 1995	4-7
4.4	Demographic Correlates of Heavy Alcohol Use, Past 30 Days, Total DoD	4-10
4.5	Negative Effects of Alcohol Use, Past 12 Months, by Pay Grade	4-14
4.6	Serious Consequences of Alcohol Use, by Drinking Level	4-16
4.7	Participation in Alcohol Counseling and Treatment Programs Since Joining the Military	4-17
4.8	Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians for Persons Aged 18-55	4-19
5.1	Trends in Any Illicit Drug Use, Past 30 Days and Past 12 Months, by Service, 1980-1995	5-2
5.2	Estimates of Drug Use, Past 12 Months, Unadjusted and Adjusted for Sociodemographic Differences	5-4
5.3	Illicit Drug Use, Past 30 Days and Past 12 Months	5-6
5.4	Demographic Correlates of Any Illicit Drug Use, Past 12 Months, Total DoD	5-8
5.5	Illicit Drug Use and Productivity Loss, Past 12 Months, Total DoD	5-10
5.6	Standardized Comparisons of the Prevalence of Any Illicit Drug Use Among Military Personnel and Civilians, Past 30 Days, for Persons Aged 18-55	5-12
6.1	Trends in Cigarette Use, Past 30 Days, by Service, 1980-1995	6-2
6.2	Estimates of Cigarette Use, Unadjusted and Adjusted for Sociodemographic Differences	6-4
6.3	Demographic Correlates of Cigarette Use, Past 30 Days, Total DoD	6-7
6.4	Cigarette Use and Productivity Loss, Past 12 Months, Total DoD	6-10
6.5	Serious Attempt to Stop Smoking Cigarettes During the Past Year	6-12
6.6	Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, for Persons Aged 18-55	6-14
6.7	Prevalence of Smokeless Tobacco Use, Past 30 Days	6-16

List of Tables (continued)

Table		Page
6.8	Smokeless Tobacco Use, Past 30 Days for All Personnel and for Males, Unadjusted and Adjusted for Sociodemographic Differences	6-17
6.9	Prevalence of Cigar or Pipe Use, Past 12 Months, for All Personnel and for Males	6-18
7.1	Prevalence of Overweight Among Active-Duty Personnel, by Age and Gender	7-3
7.2	Involvement in Strenuous Exercise, Past 30 Days	7-5
7.3	Involvement in Strenuous Exercise, Past 30 Days, by Gender and Pay Grade, Total DoD	7-6
7.4	Blood Pressure Screening and Awareness, by Selected Sociodemographic Characteristics	7-7
7.5	Lifetime Prevalence of High Blood Pressure, by Selected Sociodemographic Characteristics	7-10
7.6	Actions Taken to Control High Blood Pressure	7-12
7.7	Cholesterol Screening, by Age	7-17
7.8	Lifetime Prevalence of Elevated Cholesterol, by Gender and Age	7-19
7.9	Hospitalization for Injuries, Past 12 Months, by Selected Sociodemographic Characteristics	7-22
7.10	Seat Belt Use, by Gender and Age	7-24
7.11	Helmet Use Among Motorcyclists and Bicyclists, by Gender, Past 12 Months	7-26
7.12	Lifetime Prevalence of Sexually Transmitted Disease, by Gender and Total Number of Partners	7-28
7.13	Condom Use at Last Encounter Among Sexually Active Unmarried Personnel, by Selected Sociodemographic Characteristics	7-30
7.14	Frequency of Condom Use Among Sexually Active Unmarried Personnel, by Number of Sexual Partners, Past 12 Months, Total DoD	7-32
7.15	General Knowledge About AIDS, by Service	7-34
7.16	Beliefs About How AIDS Is Transmitted, by Service	7-35
8.1	Levels of Perceived Stress at Work and in Family Life, Past 12 Months	8-2
8.2	Specific Sources of Stress, Past 12 Months, by Gender, Total DoD	8-3
8.3	Perceived Stress and Productivity Loss, Past 12 Months, Total DoD	8-5
8.4	Need for Further Assessment for Depression, by Selected Sociodemographic Characteristics	8-7
8.5	Behaviors for Coping with Stress, by Service	8-10
8.6	Behaviors for Coping with Stress, by Gender, Total DoD	8-10
8.7	Alcohol Use, Stress, and Mental Health Problems, Total DoD	8-12
9.1	Stress Associated with Being a Woman in the Military, by Selected Sociodemographic Characteristics	9-2
9.2	Access to Obstetrical or Gynecological Care for Military Women	9-3
9.3	Military Women's Degree of Satisfaction with Obstetrical or Gynecological Care, by Selected Sociodemographic Characteristics	9-5
9.4	Receipt of Pap Smears by Military Women, by Selected Sociodemographic Characteristics	9-7
9.5	Pregnancy History Among Military Women	9-8

List of Tables (continued)

Table		Page
9.6	Receipt of Prenatal Care During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics	9-10
9.7	Alcohol Use During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics	9-11
9.8	Cigarette Use During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics	9-13

List of Figures

Figure		Page
3.1	Trends in Substance Use, Past 30 Days, Total DoD, 1980-1995	3-2
3.2	Trends in Alcohol Use Negative Effects, Past 12 Months, Total DoD, 1980-1995	3-7
4.1	Trends in Alcohol-Related Negative Effects, by Service, 1980-1995	4-13

EXECUTIVE SUMMARY

This report presents the results of the 1995 DoD Survey of Health Related Behaviors Among Military Personnel. This study is the sixth in a series of surveys of active-duty military personnel conducted in 1980, 1982, 1985, 1988, 1992, and 1995 under the direction of the Office of the Assistant Secretary of Defense (Health Affairs). All of the surveys investigated the prevalence of alcohol use, illicit drug use, and tobacco use, as well as negative consequences associated with substance use. The 1985 through 1992 surveys also covered an expanded set of health behaviors and related issues. In 1995, health behavior questions were revised and items were added to assess selected *Healthy People 2000* objectives, which are a product of work disseminated in 1991 by the U.S. Public Health Service. In addition, questions were added to examine the mental health of the Active Force and specific health concerns of military women.

The eligible population for the 1995 survey consisted of all active-duty military personnel except recruits, Service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The final sample consisted of 16,193 military personnel (3,638 Army, 4,265 Navy, 3,960 Marine Corps, and 4,330 Air Force) who completed self-administered questionnaires anonymously. Participants were selected to represent men and women in all pay grades of the Active Force throughout the world. Data were collected primarily from participants in group sessions at military installations or by mail for those not attending the sessions, for a 70% response rate. Data were weighted to represent all active-duty personnel. Some of the key findings from the 1995 survey are noted below.

Substance Use and Negative Effects

The 1995 survey obtained data on alcohol, illicit drug, and tobacco use to assess prevalence and trends in use and negative effects associated with alcohol use. Comparisons were also made with civilian data. Findings show progress in many areas, but also identify issues needing further attention.

- Comparisons of findings across the survey series show a significant downward trend in the use of alcohol, illicit drugs, and cigarettes. For the total DoD during the 30 days prior to the date that a survey was completed, heavy drinking declined from 20.8% in 1980 to 17.1% in 1995; use of any illicit drugs declined from 27.6% in 1980 to 3.0% in 1995; and cigarette smoking decreased from 51.0% in 1980 to 31.9% in 1995.

- The average daily amount of alcohol (ethanol) consumed by military personnel decreased from 1.48 ounces in 1980 to 0.83 ounces in 1995, a decrease of 44% in 15 years. Overall alcohol consumption also decreased substantially among members of all of the Services. These declines are also reflected in the increase of people who abstained

from alcohol or who were infrequent/light drinkers from 25.6% in 1980 to 39.7% in 1995.

- Although there have been declines in overall alcohol use, heavy drinking (defined as having five or more drinks per typical occasion at least once a week) remains problematic. Nearly one in five military personnel engaged in heavy drinking. Further, much of the observed decline in heavy drinking from 20.8% in 1980 to 17.1% in 1995 can be attributed to changes in the sociodemographic composition of the Military since 1980. A smaller proportion of personnel in 1995 than in 1980 came from demographic subgroups who have higher rates of heavy alcohol use, such as personnel who are younger, less well educated, or unmarried.

- Between the 1992 and 1995 surveys, the rates of cigarette smoking declined significantly, whereas the rates of heavy drinking and illicit drug use did not. Nonetheless, smoking rates were considerably above the *Healthy People 2000* objective of a prevalence of no more than 20% among military personnel.

- Significant declines were found in the percentage of military personnel experiencing alcohol-related serious consequences, productivity loss, and symptoms of dependence. Serious consequences declined from 17.3% in 1980 to 7.6% in 1995; productivity loss from 26.7% in 1980 to 16.3% in 1995; and symptoms of dependence from 8.0% in 1980 to 5.7% in 1995.

- Overall, 13.2% of military personnel used smokeless tobacco in the past 30 days. Use was highest among men in the Marine Corps (24.0%) and lowest among men in the Air Force (7.9%). Use was inversely related to age, being highest among men aged 18 to 24 (21.9%) and lowest among men aged 35 or older (5.5%)..

- Standardized comparisons showed substantial differences between substance use patterns of military personnel and civilians. Military personnel were significantly more likely to drink heavily than were their civilian counterparts (17.0% vs. 12.0%); were significantly less likely than civilians to use any illicit drugs in the past 30 days (3.1% vs. 10.0%); and were not significantly different from civilians in their overall rates of cigarette smoking (33.4% vs. 31.3%). However, 18- to 25-year-old military personnel were significantly more likely than their civilian counterparts to smoke cigarettes (39.4% vs. 35.5%).

Overall findings indicate that the Military made steady and notable progress during the 15 years from 1980 to 1995 in combating illicit drug use and cigarette smoking and in reducing alcohol-related problems. The DoD made less progress in reducing heavy drinking. Despite notable progress, there is still room for considerable improvement in some areas. Cigarette smoking remained common, affecting about one in every three military personnel; smokeless tobacco use was particularly high in men aged 24 or younger, affecting about one out of five; and the rate of heavy drinking affected slightly more than one in six active-duty personnel. Further, findings suggest that observed

declines in heavy drinking from 1980 to 1995 (unadjusted rates) largely a function of changes in the demographic composition of the Military.

Healthy People 2000 Baseline Measures

The 1995 DoD survey provided data for assessing selected *Healthy People 2000* objectives pertaining to rates of (a) cigarette smoking, (b) smokeless tobacco use, (c) overweight, (d) strenuous exercise, (e) blood pressure awareness, (f) blood pressure control (g) cholesterol screening, (h) injuries, (i) seat belt use, (j) helmet use, (k) condom use, (l) Pap tests, and (m) substance use during pregnancy. These data establish baseline reference points for use in assessing progress toward these goals over the next several years as the Nation and the Military approach the year 2000.

- As discussed above, the rate of cigarette use among military personnel in 1995 (31.9%) was still considerably above the objective of reducing the prevalence of cigarette smoking among military personnel to no more than 20% by the year 2000. Similarly, the prevalence of current smokeless tobacco use among young men aged 18 to 24 (21.9%) was considerably higher than the objective of 4% for males aged 24 or younger.

- Overall, the Military in 1995 had met or exceeded five of the targets examined (overweight for personnel aged 20 or older, strenuous exercise, seat belt use, Pap smears ever received, and Pap smears received in the past 3 years).

- Other targets had been met by at least some demographic subgroups in the Military, even if not by the entire force. For example, the objective of 75% of people having had their cholesterol checked in the past 5 years had been reached among personnel aged 25 to 49 and those aged 50 or older.

- Military personnel were 10 percentage points or less away from reaching the *Healthy People 2000* targets for another four behaviors (overweight for personnel under age 20, helmet use for motorcyclists, condom use, no cigarette use during pregnancy).

- The percentage of personnel with a history of high blood pressure who were taking action (i.e., taking medication, dieting, cutting down on salt intake, exercising) to control their blood pressure (49.3%) was considerably lower than the *Healthy People 2000* objective of at least 90%. Among personnel who had a greater likelihood of being currently hypertensive, the percentage of these personnel who were taking action to control their blood pressure (61%) was still considerably lower than the target of 90%.

- The rate of hospitalization for injuries in the past 12 months (approximately 3,400 per 100,000 personnel) was more than four times higher than the targeted rate of 754 per 100,000 personnel.

Thus, the Military made good progress by 1995 in a number of areas, but faces considerable challenges in meeting the targets in all areas by the year 2000. The areas

where targets were met are those where military regulations help ensure compliance with the desired behaviors (weight control, exercise, seat belt use, Pap tests). It is likely to be more challenging to reach the targets in other areas where change is more dependent on the initiative of individuals. The largest gaps and greatest challenges will be to meet the objectives for smoking, smokeless tobacco, blood pressure screening, controlling high blood pressure, reducing injuries that require hospitalization, and increasing helmet use by bicyclists. In addition, the fact that the Military may have met a *Healthy People 2000* objective in 1995 may not guarantee that it will continue to meet this objective in subsequent years.

Findings on condom use among sexually active unmarried personnel also suggest that this is an area needing additional health education interventions. Future interventions will need to encourage personnel with multiple sexual partners to reduce their risk for sexually transmitted disease (STD) infection or transmission through reductions in the numbers of sexual partners, more consistent use of condoms, or both. Overall, Military personnel had high levels of knowledge that the virus that causes the acquired immune deficiency syndrome (AIDS) can be sexually transmitted between a man and a woman. Nonetheless, there was little relationship between the number of sexual partners that unmarried personnel had in the past 12 months and whether they used a condom the last time they had sexual intercourse. Furthermore, a sizable percentage of sexually active unmarried personnel who had multiple sexual partners used condoms inconsistently or not at all when they had sexual intercourse.

Mental Health, Stress, and Coping

The survey examined a variety of mental health issues among military personnel, including stress, coping mechanisms, symptoms of depression, and relationships between alcohol use and mental health problems.

- Military personnel were more likely to describe their military duties as stressful than their family or personal lives. The most frequently indicated stressor for both men (23.7%) and women (21.1%) was separation from family. Men (17.1%) were more likely than women (6.9%) to experience stress due to deployment, whereas women (17.0%) were more likely than men (12.3%) to perceive stressors related to changes in the family.

- A somewhat greater percentage of women (20.8%) than men (17.1%) screened higher for depression and those who were younger, less well educated, single, and in the lower enlisted pay grades showed higher rates of depressive symptomatology. The differences should be interpreted with caution, however, recognizing that comprehensive assessment procedures are required to identify cases of specific psychiatric disorders, such as major depressive disorder.

- The three most commonly used strategies for coping with stress were adopting a problem-solving approach, seeking social support, and

engaging in health-related behaviors, such as exercise. However, nearly a quarter of military personnel commonly used alcohol to cope with stress, daily pressures, and feelings of depression.

- Heavy users of alcohol had more problems with stress and more mental health problems than did their counterparts who did not drink. This suggests that there is a strong comorbid relationship between heavy alcohol use and mental health problems and is an area needing further assessment.

Overall, these data indicate that most military personnel have good mental health and appropriate coping mechanisms for managing stress. However, a sizable group experience problems in these areas, which suggests the need for more attention to these issues. It is important to understand these relationships, the risk factors that contribute to them, and the potential clinical, research, and policy actions that should be taken to address them.

Health Issues Among Military Women

The survey also investigated several health issues that may affect the readiness of military women: stress associated with being a woman in the Military, access to and satisfaction with obstetrical and gynecological (OB/GYN) care, receipt of Pap smears, pregnancy, prenatal care, and substance use during pregnancy. Overall findings suggest that military women believed that they had good access to health care services. However, survey findings also suggest that women's health may have been compromised in several ways.

- About 33% perceived high levels of stress associated with being a woman in the Military.

- The receipt of Pap smears was nearly universal, OB/GYN services were reportedly easy to obtain, and military women were generally satisfied with the quality of care received in the Military.

- More than 80% of military women who had been pregnant within the past 5 years received prenatal care within the first trimester.

- Approximately 84% of military women who were pregnant in the past 5 years did not smoke cigarettes during their last pregnancy. This percentage of abstinence from cigarettes during pregnancy was somewhat lower than the *Healthy People 2000* objective of 90%. About 85% of women who had been pregnant in the past 5 years abstained from alcohol during their last pregnancy.

Maintaining the health of the Active Force is an important factor contributing to mission readiness. The findings noted above and other related findings are discussed in greater detail in the report. The report also describes the methodologies used to develop these estimates and suggests areas in need of attention to address key health issues facing the Military in the 1990s.

1. INTRODUCTION AND BACKGROUND

In this report, we present the findings from the 1995 Department of Defense (DoD) Survey of Health Related Behaviors Among Military Personnel, conducted by the Research Triangle Institute of Research Triangle Park, North Carolina. We describe substance use, health behaviors related to selected *Healthy People 2000* objectives (Public Health Service [PHS], 1991), and progress since 1980 toward achieving health-related goals set forth by the DoD. For this report, "substance use" includes use of alcohol, other drugs, and tobacco (cigarettes, smokeless tobacco, and pipes and cigars).

This study is the sixth in a series of surveys of military personnel across the world conducted in 1980, 1982, 1985, 1988, 1992, and 1995 under the guidance of the Office of the Assistant Secretary of Defense for Health Affairs or OASD(HA). All of the surveys have assessed the prevalence of alcohol use, drug use, and tobacco use; adverse consequences associated with substance use; and since 1982, trends in substance use and related adverse consequences of use. Beginning in 1985, the surveys examined the effect of health behaviors other than substance use on the quality of life of military personnel. In 1988, this emphasis was expanded and oriented around the DoD health promotion objectives and provided information about knowledge of and attitudes toward the acquired immune deficiency syndrome (AIDS). In 1992, in collaboration with the DoD and the Services, we broadened this aspect of the survey even further to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition, as well as other special issues, including the impact of Operations Desert Shield and Desert Storm on substance use rates and the effects of problem gambling in the Military. In 1995, we revised the health behavior questions and added items to assess selected *Healthy People 2000* objectives. Also in 1995, we included additional questions to assess the mental health of the force and specific health concerns of military women, including stress, pregnancy, substance use during pregnancy, and receipt of health services.

In this chapter, we discuss the relevance of health promotion to the Military, provide background on the DoD survey series, describe objectives for the 1995 survey, and briefly present findings from other studies of the prevalence of substance use and other health behaviors among military personnel.

1.1 Organization of the Report

In this report, we describe the substance use and other health behaviors among active-duty military personnel throughout the world in 1995. We describe the general methodology for the 1995 survey in Chapter 2, including sampling design, instrument development, data collection procedures, survey performance rates, sample participants and military population characteristics, key definitions and measures, analysis techniques, and strengths and limitations of the data. In Chapter 3, we provide an

overview of trends in substance use and other health behaviors for the total DoD population, including measures related to specific *Healthy People 2000* objectives. Trend analyses presented in Chapter 3 compare findings from the 1995 DoD survey with findings from the five previous surveys conducted worldwide for the DoD.

In the next three chapters, we describe the prevalence, trends, correlates, and comparisons with the civilian population of rates of alcohol use (Chapter 4), illicit drug use (Chapter 5), and tobacco use (Chapter 6). Chapter 6 also describes progress in meeting the *Healthy People 2000* objectives on cigarette smoking and smokeless tobacco use.

Chapter 7 examines health behaviors and health promotion, including behaviors related to fitness and cardiovascular disease risk reduction, injuries and injury prevention, and sexually transmitted disease (STD) risk reduction, including an assessment of progress toward *Healthy People 2000* objectives in each of these areas. In connection with findings on STD risk reduction, we also present information on military personnel's knowledge and beliefs about AIDS.

Chapters 8 and 9 examine two special issues: mental health of the force and health issues specifically affecting women in the Military. Chapter 8 examines sources of stress and coping mechanisms, symptoms of depression, and relationships between mental health problems and alcohol use. Chapter 9 discusses military women's perceptions of stress associated with being a woman in the Military, perceptions of the quality of obstetric and gynecological (OB/GYN) care, health behaviors related to cervical cancer screening and pregnancy, and maternal and infant health issues.

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 1995 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. Appendix E provides a detailed discussion of alcohol summary measures used in this report. In Appendix F, we discuss the technical details of our approach to standardization and to multivariate analyses. Appendix G compares alcohol drinking levels based on two estimation procedures. Finally, Appendix H is a copy of the survey instrument for the 1995 survey.

1.2 Health Promotion and the Military

1.2.1 Background and Relevance

In the United States, public health measures, such as improved sanitation, better housing conditions, improved nutrition, immunizations, and development of antibiotics, have been largely responsible for reductions in deaths due to infectious diseases that were common in the early part of this century. In 1900, for example, the major causes of death were infectious diseases, such as influenza, pneumonia, diphtheria, and tuberculosis (PHS, 1979). In contrast, the current major causes of death in the United States are now chronic diseases; nearly two-thirds of the deaths in the United States in 1991 were caused by heart disease, cancer, and stroke. Unintentional injuries were the fifth leading cause of death in the United States in 1991, after heart disease, cancer, stroke, and chronic obstructive pulmonary diseases (Centers for Disease Control and Prevention [CDC], 1993a). Among adolescents and young adults aged 15 to 24, however, unintentional injuries are the leading cause of death (PHS, 1991; CDC, 1992).

In addition, AIDS was the ninth leading cause of death in 1991 (CDC, 1993a). Although male-to-male sexual contact remains the most common route of infection (CDC, 1994c, 1995), a rapidly increasing proportion of AIDS cases are being infected with the human immunodeficiency virus (HIV) through heterosexual contact with an infected partner, due in part to an expanded case definition of AIDS that is identifying an increased number of women with AIDS (CDC, 1994c, 1994e).

Although these diseases and injuries may sometimes be caused by environmental conditions (e.g., occupational exposure to a known carcinogen, such as asbestos), many of these problems are related to "lifestyle" factors, such as cigarette smoking, lack of exercise, fat and cholesterol intake, alcohol use (including driving while impaired), nonuse of seat belts, or risky sexual behaviors (e.g., not using condoms or having multiple sexual partners). In particular, the Surgeon General considers tobacco use to be the single most important preventable cause of death and disease in the United States (Office on Smoking and Health, 1989). More than one in four of the deaths in the United States each year can be attributed to alcohol, illicit drug, or tobacco use (Institute for Health Policy [IHP], 1993). Cirrhosis of the liver, which is often associated with chronic, heavy alcohol use, was the 11th leading cause of death in 1991 (CDC, 1993a). In the second half of 1992, alcohol was also involved in some 45% of motor vehicle fatalities, and over one-third of these fatalities had blood alcohol concentrations of 0.10% or greater, at or above the legal level of intoxication in most States (CDC, 1993c, 1993d).

In addition, cancer screening procedures, such as Pap smears, can detect potentially malignant cell growths early in their development. Thus, although cervical cancer is a major cause of cancer-related deaths among women (CDC, 1993b, 1994a), such

deaths can be prevented if the cancers are detected sufficiently early (CDC, 1994d; PHS, 1991).

Just as these health-related behaviors are of relevance to society in general, they are also of interest and concern to the DoD and the Services for a number of reasons. First, the health behaviors and habits that military personnel acquire or receive reinforcement to maintain during their stay in the Military can sow the seeds for the kinds of chronic diseases described above, or reduce the risk of these diseases. Even though the military force is comprised primarily of young, healthy individuals, behaviors such as cigarette smoking and heavy alcohol use can lead to serious health problems later in life. Conversely, military personnel can still maintain behaviors that promote health, such as vigorous physical exercise, long after they are discharged. Effective management of stress, depression, and other mental health problems can also contribute to healthier military personnel.

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

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

For these reasons, the DoD has been placing increased emphasis on health promotion since the 1980s. In the remainder of this section, we briefly describe DoD health promotion policies. We also discuss health objectives for the Nation and the Military and their relevance to the 1995 DoD survey. Finally, we discuss general health issues specifically confronting military women.

1.2.2 DoD Health Promotion Policies

The DoD has had long-standing interest in the health and well-being of its members. Indeed, having ready access to a comprehensive health care program at little or no cost to the member has long been viewed as an important benefit of military life (Stanley & Blair, 1993). Health promotion efforts in the Military emerged as an outgrowth of problems that surfaced due to drug and alcohol abuse in the 1970s. In response to reports of widespread drug abuse among troops during the Vietnam War, and

in recognition of the significance of the alcohol abuse problem in the Services, the DoD issued a policy directive in March 1972 (No. 1010.2) that set forth prevention and treatment policies for alcohol abuse and alcoholism among military personnel. Other DoD policy directives (e.g., DoD Directives Nos. 1010.3 and 1010.4 and Instruction Nos. 1010.5 and 1010.6) and programs provide for the following:

- 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 1986, the DoD established a formal, coordinated, and integrated health promotion policy (DoD Directive No. 1010.10) designed to improve and maintain military readiness and the quality of life of DoD personnel and other beneficiaries. 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: smoking prevention and cessation, physical fitness, nutrition, stress management, alcohol and other drug abuse prevention, and prevention of hypertension.

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

Physical fitness programs aim to encourage and assist military personnel to establish and maintain the physical stamina and cardiorespiratory endurance necessary

for good health and a productive lifestyle. Programs that integrate fitness activities into normal work routines and community activities are encouraged.

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

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

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

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

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

In 1991, the DoD set forth a comprehensive military policy on the identification, surveillance, and administration of military personnel infected with HIV (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 HIV is transmitted and how to prevent transmission.

In addition, after the publication of *Healthy People 2000* (PHS, 1991), the DoD identified a subset of objectives of most relevance to the military. These objectives have, in part, focused attention on specific health-related behavior changes that are desirable to achieve during the present decade. In the next section, we discuss these objectives for the Nation and the Military in greater detail.

1.2.3 *Healthy People 2000* and the Military

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

The purpose of Healthy People 2000, which sets out health objectives to be achieved by the year 2000, is to commit the Nation to the attainment of three broad goals during the decade of the 1990s:

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

Responding effectively to the health challenges of the 1990s requires a clear understanding of the health-related threats and opportunities facing Americans. This is to be achieved by setting measurable targets or goals across 22 priority areas grouped into four categories (health promotion, health protection, preventive services, and surveillance and data systems) as follows:

- Health Promotion:
  1. Physical Activity and Fitness
  2. Nutrition
  3. Tobacco
  4. Alcohol and Other Drugs
  5. Family Planning
  6. Mental Health and Mental Disorders
  7. Violent and Abusive Behavior
  8. Educational and Community-Based Programs
- Health Protection:
  9. Unintentional Injuries
  10. Occupational Safety and Health
  11. Environmental Health
  12. Food and Drug Safety
  13. Oral Health
- Preventive Services:
  14. Maternal and Infant Health
  15. Heart Disease and Stroke
  16. Cancer
  17. Diabetes and Chronic Disabling Conditions

18. HIV Infection
19. Sexually Transmitted Diseases
20. Immunization and Infectious Diseases
21. Clinical Preventive Services

- Surveillance and Data Systems
  22. Surveillance and Data Systems

Health promotion strategies relate to personal choices made in a social context that reflect an individual's lifestyle and influence prospects for future health. Health protection strategies are those related to environmental or regulatory measures that confer protection on large population groups. In contrast to health promotion strategies (which have an individual focus), health protection strategies generally involve a community-wide focus. Preventive services include counseling, screening, and immunization interventions for individuals in clinical settings. Surveillance and data systems are incorporated to ensure useful measurement of progress toward achievement of the objectives. Existing data sources (e.g., ongoing surveys) are identified that can be used to measure progress, and the need for additional data sources are noted. The key to the effort is a set of 383 measurable national health objectives for reducing preventable death, disease, and disability.

Healthy People 2000 calls for individuals, families, communities, health professionals, the media, and government to share the responsibility to improve the Nation's health profile. Simply stated, all segments of society must work together to meet the challenge of the *Healthy People 2000* goals and objectives. *Healthy People 2000* offers hope that through cooperative efforts, all Americans can live longer, healthier lives.

The response from the DoD has been a review of the *Healthy People 2000* objectives to identify those most relevant to the Military. Of the 383 objectives, 181 were identified as being of initial primary concern to DoD. Of these 181 objectives, 45 were prioritized and designated to be of the highest importance for near-term measurement (Office of the Assistant Secretary of Defense [Health Affairs], 1992). From these 45 objectives, the DoD identified a subset that focused on health-related behaviors thought to be measurable with surveys.

The DoD has identified the 1995 DoD survey as the key source of measures for many of these objectives. As discussed in Section 1.4, a key objective of the 1995 survey was to use the survey to establish baseline measures of many of these behavioral objectives. Subsequent surveys can then be used to assess change and progress toward meeting the objectives.

The 1992 DoD survey had already provided some information about a limited number of *Healthy People 2000* objectives among military personnel. Specifically, the 1992 survey provided data on objectives pertaining to

- cigarette use and smokeless tobacco use,
- physical exercise,
- cardiovascular disease risk reduction, and
- HIV and other STD risk reduction.

This effort has been expanded in the 1995 survey through the addition of new questions specifically aimed at measuring *Healthy People 2000* objectives. Specific *Healthy People 2000* objectives addressed through the 1995 DoD survey include the following:

- reduce cigarette smoking to a prevalence of no more than 20% among military personnel;
- reduce smokeless tobacco use by males aged 24 and younger to a prevalence of no more than 4%;
- reduce overweight, as measured by the Body Mass Index (BMI) to a prevalence of no more than 20% among people aged 20 and older and no more than 15% among people under age 20;
- increase to at least 20% the proportion of people aged 18 or older who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion;
- increase 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;
- increase to at least 90% the proportion of people with high blood pressure who are taking action to help control their blood pressure;
- increase to at least 75% the proportion of adults who had their blood cholesterol checked within the preceding 5 years;
- reduce nonfatal unintentional injuries that require hospitalization to no more than 754 per 100,000 people;
- increase use of occupant protection systems, such as safety belts, inflatable safety restraints, and child safety seats, to at least 85% of motor vehicle occupants;
- increase use of helmets to at least 80% of motorcyclists and at least 50% of bicyclists;

- increase to more than 50% the proportion of sexually active, unmarried people who used a condom at last sexual intercourse;
- increase to at least 95% the proportion of women aged 18 and older with intact uterine cervix who have ever received a Pap test, and to at least 85% those who received a Pap test within the preceding 1 to 3 years; and
- increase abstinence from tobacco use by pregnant women to at least 90% and increase abstinence from alcohol by at least 20%.

The 1995 DoD survey provides baseline data for these objectives and a measure of progress for the objectives assessed in the 1992 survey.

1.3 DoD Survey Series

A systematic effort to obtain data that can be used to guide and evaluate health and substance abuse programs and policies began in 1980 under the direction of the OASD(HA). The DoD initiated a series of recurrent surveys to (a) improve understanding of the nature, causes, and consequences of substance use and health in the Military; (b) determine the appropriateness of the emphasis placed on program elements; and (c) examine the impact of current and future program policies. The 1980 survey was conducted by Burt Associates, Incorporated, of Bethesda, Maryland (Burt, Biegel, Carnes, & Farley, 1980). The 1982, 1985, 1988, 1992, and 1995 surveys by Research Triangle Institute of Research Triangle Park, North Carolina (Bray et al., 1983, 1986, 1988, 1992). All six surveys have assessed the extent and consequences of alcohol and other drug use. Beginning in 1985, the surveys have broadened their focus to include an assessment of health promotion efforts.

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

The 1988 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel maintained the prior emphases on nonmedical drug use and alcohol use and associated consequences and programmatic responses (Bray et al., 1988). However, the examination of health attitudes and behaviors had a more central role. Hence, the name of the survey was changed accordingly. Questions on health behaviors other than substance use were augmented, and additional questions on stress were

included. Overall, the questions permitted the assessment in the Military of the DoD health promotion areas of alcohol and drug abuse prevention, smoking prevention and cessation, physical fitness, nutrition, stress management, and hypertension prevention behaviors. In addition, the 1988 survey examined attitudes and knowledge related to AIDS, with a view toward determining the need for additional educational efforts.

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

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

1.4 Overview and Objectives of the 1995 DoD Survey

The 1995 survey continues this broader health promotion focus begun in 1985 and expanded in later surveys and includes a greater emphasis on information for assessing progress toward *Healthy People 2000* objectives. Within the contexts of the entire survey series and the health promotion focus of more recent surveys in the series, the 1995 DoD survey has two broad aims:

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

In keeping with these two aims, major objectives of the 1995 survey are as follows:

- to continue the analysis of trends in use of alcohol, illicit drugs, and cigarettes, and consequences associated with substance use;
- to describe important correlates of substance use among military personnel in 1995;
- to compare rates of alcohol, illicit drug, and cigarette use among military personnel in 1995 with rates from comparable civilian populations;
- to provide estimates for health behaviors pertaining to fitness and cardiovascular disease risk reduction, injuries and injury prevention, STD risk reduction, cervical cancer screening, and maternal and infant health;
- to identify important correlates of these health behaviors; and
- where appropriate, to compare health behavior data between 1992 and 1995.

Thus, this report for the 1995 survey continues to provide estimates of use of alcohol, illicit drugs, and cigarettes, but it gives considerable attention to health behaviors other than substance use.

As part of the objective of estimating the prevalence of use of different tobacco products in 1995, the number of questions about use of smokeless tobacco products (i.e., chewing tobacco or snuff) was expanded to allow measurement of the prevalence of smokeless tobacco use in the past 30 days (i.e., current use) and throughout the lifetime. Smokeless tobacco use was first included in the survey series in 1985, but has been limited to a single question about frequency of use in the past 12 months.

The 1995 survey also included more detailed questions about the mental health and quality of life of military personnel. Specifically, the questionnaire contained questions about stress experienced at work and in family life, specific sources of stress, and approaches to dealing with stress. It also contained questions about global mental health status and symptoms of depression.

Finally, the content of the 1995 survey reflected the increasingly important role of women in the Military and special considerations being directed to their health needs (Institute of Medicine, 1995). For the first time in the survey series, a set of questions was included on health issues that apply specifically to military women. Some of these questions provide information for *Healthy People 2000* objectives that apply to women but not men (i.e., Pap tests and substance use during pregnancy). Other questions ask about access to OB/GYN care, opinions about the quality of that care, the amount of stress

associated with being a woman in the Military, pregnancy history, and receipt of prenatal care services.

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

A number of epidemiologic surveys and other studies have documented the nature and extent of substance use (i.e., alcohol, illicit drug, and tobacco use) both for civilians and for military personnel. This section briefly reviews these data. The DoD survey series has been the major source of comprehensive information on substance use among military personnel. The major sources of information documenting substance use for civilians are national alcohol surveys and the National Household Survey on Drug Abuse (NHSDA) series for alcohol use and illicit drug use; the Monitoring the Future survey series for alcohol, tobacco, and other drug use among high school seniors and young adults; and the NHSDA and the National Health Interview Survey (NHIS) for tobacco use. Findings from these surveys provide a context for interpreting findings from the 1995 DoD survey in terms of trends both within the Military and in the broader civilian population, from which the military population is drawn.

1.5.1 Military Population Studies

Findings from prior DoD surveys on the prevalence of substance use among personnel in the total DoD population (Bray et al., 1992; Bray, Kroutil, & Marsden, 1995; Kroutil, Bray, & Marsden, 1994) indicate steady and notable reductions in overall alcohol use, illicit drug use, and cigarette smoking. However, there was a less noticeable decline in heavy alcohol use, and the declines in heavy alcohol use since 1980 could largely be explained by changes in the Military's demographic composition. Specific highlights from prior DoD surveys include the following:

Prevalence of Alcohol, Illicit Drug, and Tobacco Use

- The percentage of the military population who were abstainers from alcohol (i.e., drank once a year or less and not in the month prior to the survey) increased significantly from 1980 (13.5%) to 1992 (20.4%), or approximately one out of five personnel in 1992.

- Overall alcohol consumption, as measured by average daily ethanol consumption, declined significantly from 1.48 ounces in 1980 to 0.81 ounces in 1992.

- The prevalence of heavy alcohol use (i.e., consumption of five or more drinks per occasion on at least a weekly basis in the past 30 days) declined significantly from 20.8% in 1980 to 15.2% in 1992. The rate was relatively stable from 1980 to 1985 (between 20% and 25% of all personnel), decreased significantly between 1985 (22.9%) and 1988 (17.0%), and then remained at about the same level between 1988

and 1992 (15.2%). However, see the discussion below for the effects of adjusting for demographic changes.

- The rate of any illicit drug use in the past 30 days declined sharply from 27.6% in 1980 to 3.4% in 1992. The decreases in illicit drug use were statistically significant between each of the five survey years from 1980 to 1992.

- The percentage of military personnel who smoked cigarettes in the 30 days prior to the survey showed significant declines over the 12-year period from 51.0% in 1980 to 35.0% in 1992. There were significant declines in the prevalence of smoking between each of the survey years following 1982.

- In 1992, some 17.4% of all military personnel used smokeless tobacco in the past 12 months. However, nearly one-third of military men aged 24 and younger (32.5%) used smokeless tobacco in the past 12 months, and 17.1% used smokeless tobacco on a weekly basis. Furthermore, nearly half (47.4%) of Marine Corps men aged 24 and younger used smokeless tobacco in the past 12 months, and 23.9% used it on a weekly basis.

Demographic Correlates of Use

- Heavy alcohol use and illicit drug use were consistently related to education, age, marital status, and pay grade across the entire survey series. Specifically, personnel who had less education, were younger, unmarried, and in the lower pay grades were consistently more likely to drink heavily in the past month and to use illicit drugs in the past year.

- Military men showed a higher prevalence of heavy alcohol use than did military women across the entire survey series. For illicit drugs, men and women had similar rates of use from 1980 to 1988. In 1992, however, men were nearly twice as likely as women to have used illicit drugs in the past 12 months.

- Cigarette smoking was consistently related to education and pay grade. Military personnel with less education consistently showed a higher prevalence of smoking than personnel with more education. Smoking was also consistently more prevalent among enlisted personnel (E1 to E9) than among officers (O1 to O10).

Adjustments for Demographic Changes Over Time

- Analyses that controlled for demographic changes in the Military from 1980 to 1992 (i.e., increases in percentages of personnel who were female, older, married, and had more education) indicated that the declines in the rates of illicit drug use and cigarette smoking were not explained by demographic changes.

- Analyses of rates of heavy drinking that adjusted for demographic changes in the Military suggested that declines from 1980 to 1992 were largely a function of changing demographics. When estimates of heavy alcohol use were adjusted to reflect demographic changes in

the Military, the adjusted rate of heavy alcohol use in 1992 had not changed significantly from the 1980 rate.

1.5.2 Civilian Population Studies

As for the military population, findings from surveys of the civilian population indicate declines in the prevalence of cigarette smoking and any illicit drug use, but a relatively stable prevalence of heavy alcohol use. The reductions in cigarette smoking began in the mid-1960s following the publication in 1964 of the first Surgeon General's report on smoking. Declines in illicit drug use have occurred more recently, beginning in the early 1980s. However, some recent survey data suggest that drug use, and particularly marijuana use, may be increasing again among some subgroups in the civilian population (SAMHSA, 1995b; University of Michigan, 1994).

Highlights on the prevalence of substance use among the civilian population based on civilian alcohol surveys (Clark & Hilton, 1986; Clark & Midanik, 1982; Polich & Kaelber, 1985), the 1993 and 1994 NHSDAs (SAMHSA, 1995a, 1995b, 1995c), the Monitoring the Future study of high school seniors and young adults (University of Michigan, 1994), and the NHIS (CDC, 1993e) include the following:

- In 1994, about 6% of the civilian population were heavy drinkers (SAMHSA, 1995b). However, approximately 13% of young adults aged 18 to 25 in 1994 were heavy alcohol users, based on reported consumption of five or more drinks per occasion on 5 or more days in the past month. In addition, men were more likely than women to drink and to drink heavily. Other studies have found rates of "problem" drinking to be higher for young men, minorities, or those with unstable work or family environments (Clark & Hilton, 1986).

- Trend data on illicit drug use from the NHSDAs (SAMHSA, 1995b) indicate that use of illicit drugs among the civilian population generally peaked during the late 1970s, declined through 1992, and remained relatively stable in 1993 and 1994. Although trend data indicate declines since the late 1970s, some 11% of the 1994 U.S. civilian, noninstitutionalized population aged 12 and older, or roughly 23 million civilian Americans, used at least one illicit drug in the past year.

- The prevalence of drug use may be increasing among some population subgroups, such as youth and young adults. In particular, marijuana use in the past 12 months and past month among high school seniors has been increasing since 1992. Recently released findings from the 1994 Monitoring the Future study (University of Michigan, 1994) indicate that nearly one-fifth (19.0%) of twelfth graders had used marijuana in the past 30 days, up from 15.5% in 1993. Some 3.6% of high school seniors were daily marijuana users in 1994, up from 2.4% in 1993. Preliminary findings from the 1994 NHSDA also confirm an upturn in the prevalence of marijuana use among youth aged 12 to 17 (SAMHSA, 1995b).

- The prevalence of cigarette smoking among civilians has decreased markedly since the first report of the Surgeon General's Advisory Committee in 1964. In 1965, some 42% of adults smoked cigarettes on a regular basis (Giovino et al., 1994); in 1992, the figure was about 27% (CDC, 1994g).

- Smoking rates for men have decreased more rapidly than for women, decreasing the sex differential apparent in the 1960s. In 1965, 52% of men and 34% of women were current smokers (Giovino et al., 1994). From 1965 to 1991, the prevalence of smoking declined by 46% among men and 31% among women, such that 28% of men and 24% of women were current smokers in 1991. Rates among men and women in 1992 (29% and 25%, respectively) were virtually unchanged from rates in 1991 (CDC, 1994g).

- Civilian consumption of smokeless tobacco products (snuff and chewing tobacco) increased rapidly beginning in the early 1970s (Connolly, Winn, Hecht, Henningfield, Walker, & Hoffman, 1986), particularly among young males. In 1994, some 17.2% of the household population aged 12 and older had ever used smokeless tobacco (4.8% in the past year and 3.3% in the past month) (SAMHSA, 1995c). Past month use was substantially higher among men than women (6.1% vs. 0.7%) and was highest among young men aged 18 to 25 (12.1%).

- Findings from the 1991 NHIS (CDC, 1993e) also indicated that the prevalence of current smokeless tobacco use (defined as lifetime use at least 20 or more times and reported current use) was highest among young males aged 18 to 24. Except for women aged 65 and older, fewer than 1% of women were current smokeless tobacco users. White males were more likely than black and Hispanic males to be current smokeless tobacco users. Among current smokeless tobacco users, over one-fifth (22.9%) were current cigarette smokers, and one-third (33.3%) were former smokers.

1.5.3 Comparisons Between the Military and Civilian Populations

Although findings from both military and civilian surveys indicate declines in illicit drug use, smoking, any alcohol use, and heavy alcohol use, direct comparison of rates between these two populations can be misleading because of demographic differences between the two populations. For example, approximately 85% of the Military in 1992 was male (Bray et al., 1992, 1995). As noted above, men were more likely than women in both the military and civilian populations to be heavy alcohol users. Thus, higher rates of heavy alcohol use in the Military compared to civilians may be due in part to a much higher proportion of males in the Military, as well as other demographic differences between the military and civilian populations. Similarly, apparent differences in rates of illicit drug and cigarette use between the military and civilian populations may be due to such factors as different age and education compositions of these two populations.

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

- Rates of illicit drug use have consistently been *lower* among military personnel than among civilians when demographic differences are taken into account. The lower rates of illicit drug use among military personnel have held for both men and women and across age groups.

- Despite the consistently lower rates of illicit drug use among military personnel, the gap between military and standardized civilian rates of illicit drug use appears to be narrowing overall and among males.

- Rates of heavy alcohol use and cigarette smoking have consistently been *higher* among military personnel than among civilians.

- Although rates of heavy alcohol use have consistently been higher for the military population, the gap between the military population rates and standardized civilian rates has narrowed for the total population in 1992, and among women the gap has converged.

- Young military men aged 18 to 25 have consistently been the population group with the highest prevalence of heavy alcohol use. Furthermore, rates of heavy alcohol use among young military men are approximately twice the standardized rates for their civilian counterparts.

- The declines in the rates of cigarette use among the overall military population parallel the declines that would have been observed among the civilian population, if the civilian population's demographic characteristics had more closely resembled the military's.

1.5.4 Summary

Findings from both military and civilian studies have shown declines in illicit drug use and cigarette smoking in both populations during the 1980s and 1990s. However, recent surveys indicate that the prevalence of illicit drug use, and particularly marijuana use, may be increasing among some segments of the civilian population. The prevalence of cigarette smoking among the civilian population has been declining since the mid-1960s. Declines in the prevalence of cigarette smoking among military personnel have occurred more recently (i.e., since the early 1980s). Although cigarette smoking among military personnel in 1992 (35.0%) was at its lowest level since the DoD survey series began, this rate was still well above the *Healthy People 2000* target of 20% for military personnel by the year 2000.

In both the military and civilian populations, the prevalence of heavy alcohol use has been more stable over time. The prevalence of heavy alcohol use in the past 30 days

has stayed around 5% of the civilian population. Among military personnel, the actual prevalence of heavy alcohol use has declined since the early 1980s, but this decline appears to be due to changes in the demographic composition of the Military.

Findings from civilian surveys indicate that the prevalence of smokeless tobacco use is highest among young adult males. Findings from the 1992 DoD survey also indicate that the prevalence of smokeless tobacco use in the past 12 months was higher among young males relative to the total military population.

Comparisons of rates of substance use in the military and civilian populations that took into account demographic differences between the two populations have indicated consistently higher rates of heavy alcohol use and cigarette use in the Military, but consistently lower rates of illicit drug use in the Military. In particular, rates of heavy alcohol use among military men aged 18 to 25 have been approximately twice the standardized rates for civilian men in the same age group.

1.6 Prior Studies on Other Health Behaviors Among the Military and Civilian Populations

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

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

Concern about health behaviors other than substance use in the Military has been more recent, and various behaviors were monitored through the 1985, 1988, and 1992 DoD surveys. In particular, the 1992 survey included items on participation in health screening or education activities, nutritional practices, condom use, presence of specific health risk factors (e.g., high blood pressure), perceptions of health risks associated with different health conditions or health-related behaviors, and behavior changes undertaken to improve health.

1.6.1 Military Population Studies

As noted above, the 1992 DoD survey included questions about a variety of health behaviors in addition to substance use. Findings were discussed as they related to selected *Healthy People 2000* objectives. However, some health behavior measures in the 1992 DoD survey were not directly comparable to a given *Healthy People 2000* objective.

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

In 1992, over 60% of personnel in the total DoD, over half of personnel in the Navy and the Air Force, and approximately 80% of personnel in the Army and Marine Corps engaged in regular strenuous physical exercise for 20 minutes or more at least three times a week (Bray et al., 1992). These rates greatly exceeded the *Healthy People 2000* target of 20% for the adult population in the United States. Given the emphasis on physical fitness as part of an overall goal of military readiness, this finding is not surprising.

In contrast to the high rates of strenuous physical exercise, 6% of all active-duty personnel in 1992 were told by a health professional in the past year that they were not maintaining an adequate exercise program (Bray et al., 1992). In addition, approximately 9% of active-duty personnel in 1992 were told by a health professional in the past year that they needed to lose weight (Bray et al., 1992). A Navy study involving use of a Health Promotion Tracking Form (HPTF) estimated that approximately 11% of Navy personnel were above the Navy's acceptable weight standards (Woodruff & Conway, 1992). These findings were comparable with those of an earlier study indicating that approximately 9% of the Navy population in 1988 was either overfat or obese (Conway, Trent, & Conway, 1989; Woodruff & Conway, 1992). However, these studies do not indicate how personnel would have been classified according to the Body Mass Index (BMI), which is a person's weight in kilograms, divided by the square of the person's height in meters.

In 1992, approximately two-thirds of personnel in the total DoD and in all four Services had their blood pressure checked in the past year. As stated above, however, the *Healthy People 2000* objective for blood pressure screening relates to screening in the past 2 years and awareness of the result. Therefore, these 1992 data did not directly measure progress toward this objective.

Approximately 8% of active-duty military personnel (7.9%) in 1992 were told by a health professional in the past year that they had high blood pressure (Bray et al., 1992). Of that group, approximately 90% were taking one or more 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 (Bray et al., 1992). Thus, it would appear that the DoD and the Services in 1992 were either very close to, or were slightly exceeding the *Healthy People 2000* objective of at least 90% of adults with high blood pressure taking action to control their blood pressure. Moreover, respondents in the 1992 survey were not asked whether they were taking medication to control their high blood pressure. Had such an item been included, it is quite likely that the Military would have exceeded this 90% objective.

Slightly more than one-third of the military population (36%) in 1992 had their cholesterol checked in the previous year. Approximately 10% of all personnel were told by a health professional in the past year that their cholesterol was high (Bray et al., 1992). However, most personnel may have needed to get their cholesterol checked only within the past 5 years, not the past year.

With regard to seat belt use, Woodruff and Conway (1992) found that nearly three-fourths of the 747 Navy personnel who completed the HPTF reported using seat belts all or almost all of the time. The authors noted that personnel are required to use seat belts on-base. They also suggested that legislation requiring seat belt use in many States could be contributing to high rates of seat belt use.

The 1992 DoD survey included questions to measure condom use by military personnel. In 1992, over half of the unmarried personnel in the total DoD (50.2%) and in the Army (55.2%) and Navy (50.5%) who had ever had sexual intercourse 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 (Bray et al., 1992). What is not known is what percentage of unmarried military personnel in 1992 who were currently sexually active (i.e., in the past year or past month) used a condom the last time they had sexual intercourse.

Thus, the 1992 DoD survey provides some indication of progress toward some *Healthy People 2000* objectives, but not all items considered the appropriate time periods or were directly comparable to the objectives.

1.6.2 Civilian Population Studies

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

Findings from the NHIS indicate little change over time in rates of regular exercise. Less than half of the adult civilian population in 1985 and 1990 exercised or

played sports regularly (42% and 41%, respectively) (Piani & Schoenborn, 1993; Schoenborn, 1988). Findings from the BRFSS indicate that the prevalence of overweight (as measured by the BMI) among the adult civilian population may be increasing. The median percentages of adults who were overweight in 1990 (22.7%) and 1991 (23.4%) were greater than in any of the years from 1987 to 1989, when the median percentages were approximately 20% (Siegel, Brackbill, Frazier, Mariolis, Sanderson, & Waller, 1991; Siegel et al., 1993). These findings from the BRFSS suggest that considerable effort may be needed to reduce the prevalence of overweight among civilian adults to no more than 20% by the year 2000, although the rates were already at or below 20% in four States in 1991 (Siegel et al., 1993).

NHIS data indicate that large percentages of the adult population in 1985 and 1990 had their blood pressure checked in the past year (85% and 87%, respectively) (Piani & Schoenborn, 1993; Schoenborn, 1988). However, these results do not indicate whether the people who had their blood pressure checked knew the result. In 1990, over 80% of people with hypertension reported taking one or more of the following actions to control their high blood pressure: taking high blood pressure medication, decreasing their salt intake, losing weight, or exercising (CDC, 1994f). This rate of people taking action to control their high blood pressure in 1990 was somewhat lower than the 90% target set for the year 2000.

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

With regard to seat belt use, findings from the NHIS indicate a dramatic increase from 1985 to 1990 in the percentage of adults who reported that they wore seat belts all or most of the time when driving or riding in a car, from 36% in 1985 to 67% in 1990 (Piani & Schoenborn, 1993; Schoenborn, 1988). This increase has been attributed to the growing number of States with laws requiring use of seat belts (Piani & Schoenborn, 1993). Consistent with the notion that increased use of seat belts can be attributed to legislation requiring their use, BRFSS data indicate the five States that had the highest percentages of regular seat belt use in 1991 (Hawaii, Oregon, California, North Carolina, and New Mexico) allow police to ticket motor vehicle occupants for not wearing their seat belts, without the police first having to stop the car for another traffic violation (Siegel

et al., 1993). However, comparison of self-reported seat belt use with data from direct observation of automobile occupants suggests that estimates of seat belt use based on self-reported use "always" or "nearly always" can exceed estimates of use based on observational data by about 27% (CDC, 1988a; Siegel et al., 1991). These findings suggest that survey respondents may overreport their seat belt use.

Data from the National Highway Traffic Safety Administration's (NHTSA's) 19 Cities Survey provided baseline data on the prevalence of helmet use by motorcyclists in 1987. At that time, an estimated 60% of motorcyclists wore helmets when they rode (NCHS, 1993). Data on helmet use by bicyclists has tended to be reported for children rather than for adults (e.g., CDC, 1992), because interventions designed to encourage helmet use among bicyclists have primarily targeted children (e.g., Dannenberg & Vernick, 1993; Dannenberg, Gielen, Beilenson, Wilson, & Joffe, 1993; Ruch-Ross & O'Connor, 1993).

The National Survey of Family Growth (NSFG), sponsored by the NCHS, has collected information about condom use by the partners of sexually active women aged 15 to 44 (Mosher & Pratt, 1993). Among sexually active unmarried women, 16% consistently had their partner use condoms when they had sex. However, sexually active unmarried women with more than one sexual partner in the past 3 months were twice as likely as unmarried women with only one partner to have used condoms inconsistently (i.e., sometimes but not always) when they had sex (45% vs. 22%, respectively). Large differences were also observed in rates of inconsistent condom use depending on the race of the woman, with a higher rate of inconsistent condom use among sexually active unmarried black women (34%) than among sexually active unmarried white women (21%).

According to the 1990 NHIS, approximately half of all women aged 18 or older had ever had a Pap smear, up slightly from 1987, when 45% had ever had this test (Piani & Schoenborn, 1993; Schoenborn, 1988). In both survey years, the percentage of women who had ever had a Pap smear was directly related to income level, with women from households with lower incomes being less likely than women from households with higher incomes to have received a Pap smear. Data from the 1991 BRFSS indicate median percentages of 92% for women aged 18 and older with an intact uterine cervix who have ever had a Pap smear, and 80% for women who have had a Pap smear in the past 2 years (Siegel et al., 1993). These median percentages are close to the *Healthy People 2000* objectives of 95% for lifetime receipt of Pap smears and 85% for receipt of a Pap smear in the past 2 years (PHS, 1991). Three States in 1991 (Colorado, Maine, and Oregon) had already reached the year 2000 target for lifetime receipt of Pap smears, and three States and DC had already met the target for screening in the past 2 years (Siegel et al., 1993).

1.6.3 Summary

Findings from civilian surveys suggest that progress will still be needed with respect to several of the health objectives discussed above. However, BRFSS data for 1991 indicated that some States were already close to or had exceeded objectives related to cervical cancer screening (i.e., Pap smears) among women.

Findings from the 1992 DoD survey suggest that the Military in 1992 was either very close to or had exceeded general population *Healthy People 2000* objectives in the areas of physical exercise, actions taken to control high blood pressure, and condom use during the last sexual encounter among sexually active unmarried personnel. However, these findings cannot predict how the Military in 1995 compares with these objectives, because of turnover in military personnel since 1992. Findings from the 1995 survey are important for identifying whether the Military in 1995 continues to meet or exceed these targets. The 1995 survey also provides data to measure progress toward additional health objectives that were not measured in 1992.

Some features of military life may facilitate the Military in achieving some of these objectives before the year 2000. Given the emphasis in the Military on fitness and readiness, one might expect the military population to meet the objectives related to exercise and overweight. Similarly, access to preventive medical care is likely to be less of a problem in the military population than it is for some segments of the civilian population. The Military can also mandate that personnel receive age-appropriate medical screening at specific intervals. Thus, the Military can mandate that personnel receive preventive medical services, such as cholesterol screening or Pap tests, in accordance with targets set down in *Healthy People 2000*.

1.7 Mental Health, Stress, and Coping

In this section, we provide a brief description of selected studies examining the interrelated areas of mental health, stress, and coping that are of relevance to Military personnel. Unfortunately, however, little research-based information is available on the relationship of stressors and mental health and functioning from studies of the active-duty Military population. Several national epidemiologic studies have examined risk factors for specific mental disorders, such as stressors, and the comorbidity of mental disorders and substance abuse in civilian and veteran populations (Kessler et al., 1994; Kulka et al., 1990; Regier et al., 1990).

Several recent cases of suicide among military personnel have raised concerns about the prevalence of depressive symptoms and the relationship of depression and other mental health problems to stress and to alcohol use. Numerous studies have reported strong relationships between stress, alcohol consumption, and mental disorders, with particularly robust connections reported between stressful life events and depression,

especially for women (e.g., Pianta & Egeland, 1994). Kessler, Sonnega, Bromet, Hughes, and Nelson (1995) found in their analysis of data from the National Comorbidity Survey that stress-related psychiatric disorders were highly comorbid with depression and with substance abuse and dependence. Similar relationships among mental health and substance abuse problems have been reported in national surveys of Vietnam-era veterans (Kulka et al., 1990).

Stressors have been studied on the basis of their frequency or ordinariness ("life event" stressors vs. "daily hassles"), their intensity (e.g., mild, moderate, severe, traumatic), as well as their source (e.g., work, family life) (Holt, 1982). Findings from the National Vietnam Veterans Readjustment Study (Kulka et al., 1990), for example, show a strong relationship between exposure to traumatic stress while serving in a military combat zone and subsequent occupational instability. Indeed, Kulka et al.'s (1990) research indicates that male veterans with stress-related psychiatric disorders were more than five times as likely to be unemployed as their counterparts without such stress-related disorders.

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

Stressors related to the family environment have also been studied, and this research includes examination of major life events, such as having a child and getting married, as well as studies of day-to-day strains, such as attempting to balance the responsibilities of family with the responsibilities of work (Holt, 1982). Although both men and women experience stressors related to their personal and family relationships, women tend to report higher levels of such stress (Barnett & Baruch, 1985). Research is needed to determine the extent to which men and women in the Military may be affected differentially by responsibilities associated with familial factors, such as major changes in the family environment (e.g., birth of child) or daily strains, such as financial worries. In the 1995 DoD survey, we identified the work-related and family stressors for men and women in the Services and examined the relationship of these stressors to a specific indicator of work performance--loss of productivity.

Research has also shown that a number of variables can mediate the effects of stressors on mental health outcomes, including the use of different types of coping strategies. Coping has been defined in terms of the strategies and processes that

individuals use to modify adverse aspects of their environment and to minimize the amount of internal distress elicited by stressor events (Lazarus, 1966; Moos & Billings, 1982). Although research on the stress-moderating effects of different types of coping resources is more recent, this literature is characterized by a level of complexity that precludes succinct summarization. Nevertheless, the extant research literature suggests that coping styles aimed at managing the problem are generally more effective than coping strategies that attempt to ignore or avoid the problem and focus on emotions (Aldwin, 1993).

Social support, for example, is an extensively studied coping factor that has been shown to play a central role in adapting to stress (Etzion, 1984). Considerable research on Vietnam veterans' postwar adjustment suggests that supportive relationships both within and outside the Military can reduce the deleterious effects of exposure to a variety of stressors associated with combat and military service (Egendorf, Kadushin, Laufer, Rothbart, & Sloan, 1981; King, King, Fairbank, Keane, & Adams, 1995; Norman, 1988). Though informative, this work has focused largely on the effects of social support on military stressors associated with service in a war zone. At the present time, little is known about types of coping that military personnel currently use to manage the diversity of stressors experienced in their military duties and personal lives.

The 1995 DoD survey included a series of questions about the mental health of active-duty personnel. As in the 1988 and 1992 surveys (Bray et al., 1988, 1992), the 1995 survey asked respondents to appraise their levels of stress at work and in their intimate and family relationships. For the first time in the series, respondents also provided information on specific sources of stress and on the perceived impact of work-related, family, and interpersonal stress on their military performance. We also asked respondents to specify the strategies that they use to cope with stress. In addition, we collected information on indicators of depressive symptoms and examined the relationships among stress, depression, and alcohol use. In this report, we present findings on mental health, exposure to stress, coping, and functioning.

2. METHODOLOGY OF THE 1995 DoD SURVEY

In this chapter, we describe the methodology used for the 1995 DoD survey, which follows the same basic methodology followed in prior surveys in the series. Our discussion includes an overview of the sampling design, instrumentation and data collection procedures, and survey performance rates. In addition, we describe the 1995 survey respondents and demographic characteristics of the eligible respondent population. 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 DoD, the individual Services, and the research team. The comparability of the 1995 study design and measures of substance use and health behaviors to those of earlier DoD surveys enables comparisons of estimates across the survey years. Further, the similarity of key DoD survey measures to those used in civilian surveys enables military and civilian comparisons of substance use and health behaviors.

2.1 Sampling Design Overview

We based the sampling design for the 1995 DoD survey on a two-stage cluster sample to achieve cost efficiency while preserving the inferential capability of the sample. We designed the sample size for the 1995 survey to be similar to that of prior DoD surveys. We maintained the 1995 survey at this size and scope for the following reasons:

- *Scientific Validity*. Previous DoD surveys attained acceptable precision for critical prevalence rates. Similar levels of precision were needed to produce scientifically acceptable results for the 1995 survey.

- *Trend Analysis*. In previous DoD surveys, we were able to conduct an in-depth trend analysis for each Service-pay grade group combination. To continue such analyses, we needed to maintain the size of the 1995 sample.

- *Declining Drug Use*. Given the low rates illicit drug use in later DoD survey years, fewer substance abusers will be found in the final sample. Therefore, we needed an adequate sample size to assess the prevalence of illicit drug use.

- *The Drawdown*. Although the size of the active-duty military population has been declining, a smaller population size did not mean that we could also reduce the sample size requirements.

The eligible population of 1995 survey participants consisted of all active-duty military personnel except recruits, Service academy students, persons absent without official 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, worldwide sample) 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 was comprised of organizational units that were located in geographical proximity within each Service. The second-stage frame was comprised of eligible active-duty military personnel attached to selected first-stage sampling units (FSUs). We first constructed FSUs by combining geographically proximal Service-level organizational units in cooperation with Headquarters Liaison Officers (HLOs) appointed for each Service. 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), Army Post Office (APO)/Fleet Post Office (FPO) numbers outside the continental U.S (OCONUS), and Navy geolocation codes for afloat units.

We stratified the first-stage sampling frame by Service (Army, Navy, Marine Corps, Air Force) within two broadly defined geographic locations:

- CONUS--The 48 contiguous States within the continental United States, and
- OCONUS--Outside the continental United States.

In addition, in CONUS for the Navy, we used separate strata for afloat and ashore FSUs. The use of two regions (CONUS, OCONUS) in the 1995 survey differed from the four regions used in prior DoD surveys (Americas, North Pacific, Other Pacific, Europe). The reason for this change was to reflect the shifting distribution of the location of military forces due to the drawdown and the reassignment of overseas personnel back to CONUS.

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. In total, we constructed 592 FSUs, each with a minimum of 300 individuals, and selected 59 FSUs (i.e., nucleus installations) in the sample.

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 by pay grade groups (E1 to E3, E4 to E6, E7 to E9, W1 to W5, O1 to O3, O4 to O10) and by gender (male, female). We selected the second-stage sample with equal probability and without replacement from within second-stage strata. We constructed composite size measures to ensure that personnel within each gender-pay grade group in each first-stage stratum were equally likely to be selected. The second-stage sample consisted of 27,141 active-duty personnel (7,246 Army, 7,310 Navy, 6,458 Marine Corps, and 6,127 Air Force).

2.1.2 Phase 2 Design

The Phase 2 sample consisted of eligible persons selected for Phase 1 who did not participate in the survey. Phase 2 personnel were those 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 described in Appendix A.

2.2 Instrumentation and Data Collection Procedures

The survey questionnaire was designed to achieve the two broad purposes of the study, which were (a) to establish baseline measures to assess accomplishments of selected *Health People 2000* objectives, and (b) to continue the survey of substance abuse and health behaviors among military personnel. Military personnel completed the questionnaire during one of two phases. For Phase 1, field teams conducted group sessions at the installations where selected personnel were stationed. For Phase 2, teams mailed questionnaires to eligible personnel who did not participate in a Phase 1 session. We obtained approximately 88% of the completed survey questionnaires in Phase 1.

2.2.1 Survey Questionnaire

The survey instrument was a self-administered questionnaire designed for optical- mark reader scanning. In collaboration with the DoD, the HLOs, and other subject-matter experts from the Services, we modified the 1992 questionnaire for 1995 to provide measures for the survey objectives discussed in Chapter 1. The instrument

contains measures of selected aspects of substance use and other health behaviors. More specifically, the questionnaire includes a broad array of items about the

- quantity and frequency of alcohol use;
- adverse effects due to alcohol use;
- symptoms associated with alcohol dependence;
- use of cigarettes and other forms of tobacco;
- reasons for cigarette smoking and attempts to quit;
- frequency of nonmedical drug use;
- health behaviors related to exercise, eating, and sleeping;
- illnesses and medical care received;
- use of seat belts and helmets;
- stress experienced at work or in family life;
- physical and mental health status;
- health risks, such as high blood pressure or cholesterol;
- access to and satisfaction with medical care;
- knowledge and beliefs about human immunodeficiency virus (HIV) transmission;
- sexual practices and sexually transmitted diseases (STDs); and
- sociodemographic characteristics and military experience.

The questionnaire also contains additional items about health issues for military women, including obstetrical and gynecological (OB/GYN) care, pregnancy, prenatal care, and use of cigarettes and alcohol during pregnancy. The questionnaire appears in Appendix H.

During the fall of 1994, 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.

2.2.2 Phase 1 Data Collection

Phase 1 questionnaire administrations took place from mid-April through mid-August 1995 at the 59 selected installations located worldwide. Data collection was scheduled to be completed by the end of May, but was extended due to delays in obtaining

cooperation at selected installations. A Headquarters Liaison Officer (HLO) was appointed for each Service, and a Military Liaison Officer (MLO) at each participating installation was appointed to coordinate survey activities.

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

- generated support for the survey by sending a series of notifications to appropriate command levels;
- obtained MLO names and addresses for the research team;
- 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 the following:

- storing the survey instruments,
- receiving lists of the sampled personnel,
- notifying sampled 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. However, we allowed additional time at locations that had personnel dispersed over large geographical areas. We assigned six field teams to the CONUS region and three to the OCONUS region. Before data collection began, we held two 1-day training sessions, one for field team leaders and the other for team leaders and their team assistants to ensure that teams were familiar with all procedures to conduct the survey.

The field teams' major responsibilities were to do the following:

- 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, field teams 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 50 minutes to complete.

During the visit to an FSU (installation), team members attempted to survey all eligible individuals. They used rosters to document individuals' attendance at a session or the reasons for absences. At the completion of the site visit, field teams inventoried completed questionnaires, reconciled the inventory with documented counts from the lists of sampled personnel completing the survey, and packaged the questionnaires for shipment. The teams then shipped the questionnaires to Information Services Group (ISG), a subcontractor to RTI, for optical-scan processing.

2.2.3 Phase 2 Data Collection

At the conclusion of Phase 1 data collection for each FSU, field teams mailed questionnaires to all eligible Phase 1 nonparticipants. 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 ISG 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 can be calculated as the number of individuals in the population of inferential interest for whom 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 1995 survey, we computed four different performance rates, which we define and describe below: eligibility rate, availability rate, completion rate, and response rate among eligibles. Data for these four rates are in Table 2.1 along with the corresponding response data that we used to compute them.

2.3.1 Eligibility Rate

The eligibility rate is the percentage of individuals we selected for the sample who were still eligible several weeks later during data collection. Some individuals we selected were 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 85.7%. The rate was lowest for the Army and highest for the Air Force.

2.3.2 Availability Rate

The 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 sampled 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 72.5%. The availability rate suggests that we needed the Phase 2 data to compensate for the potential for nonresponse bias in Phase 1.

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)	7,246	7,310	6,458	6,127	27,141
2. Number of eligible persons identified[a]	5,606	6,327	5,656	5,661	23,250
3. Eligibles available during Phase 1 data collection sessions	3,737	4,677	3,877	4,563	16,502
4. Questionnaires obtained from Phase 1	3,073	3,937	3,536	3,956	14,502
5. Questionnaires obtained from Phase 1 with usable information	3,004	3,857	3,488	3,876	14,225
6. Number of Phase 2 eligible persons identified = (Item 2 - Item 4)	2,533	2,390	2,120	1,705	8,748
7. Questionnaires obtained from Phase 2 data collection	650	416	477	466	2,009
8. Questionnaires obtained from Phase 2 with usable information	634	408	472	454	1,968
9. Total questionnaires with usable information	3,638	4,265	3,960	4,330	16,193
Performance Rates					
10. Eligibility rate (%) = (Item 2/ Item 1)*100	77.4	86.6	87.6	92.4	85.7
11. Availability rate (%) = (Item 3/ Item 2)*100	66.7	73.9	68.5	80.6	72.5
12. Completion rate (%) = (Item 4/ Item 3)*100	82.2	84.2	91.2	86.7	86.1
13. Phase 1 response rate among eligibles (%) = (Item 5/Item 2)*100	53.6	61.0	61.7	68.5	61.2
14. Phase 2 response rate among eligibles (%) = (Item 8/ Item 6)*100	25.0	17.1	22.3	26.6	22.5
15. Response rate among eligibles = (Item 9/Item 2)*100	64.9	67.4	70.0	76.5	69.6

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

[a]Excludes 3,891 individuals from the sample who had a permanent change of station (PCS) (2,577) or who were separated (1,114), unknown (185), absent without official leave (AWOL) (10), or deceased (5).

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

2.3.3 Completion Rate

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 86.1% 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, this rate indicates that if personnel were available at the installations, the MLOs were effective in getting them to attend group sessions. The Marine Corps (91.2%) had the highest completion rate, followed by the Air Force (86.7%), the Navy (84.2%), and the Army (82.2%).

2.3.4 Response Rate Among Eligibles

The 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 who were 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 69.6%. This is from 7% to 10% lower than in prior DoD surveys and reflects less cooperation in the Phase 1 sessions from sampled members (especially in the Army, but also in the Marine Corps, and Air Force) and less cooperation in Phase 2 from personnel in all Services (especially in the Navy). Response rates were from 5% to 10% lower for all Services than in the 1992 survey (Bray et al., 1992).

2.4 Sample Participants and Military Population Characteristics

Table 2.2 displays the distribution of survey respondents for each Service by region and pay grade. Overall, we obtained 16,193 usable questionnaires from sampled personnel. The Air Force had the largest number of respondents (4,330), followed by the Navy (4,265), Marine Corps (3,960), and Army (3,638). The number of respondents is the result of the number of personnel we sampled in each Service and the response rates.

The pay grade distribution for the total DoD shows that the largest number of participants were E4s to E6s, followed by E7s to E9s, E1s to E3s, O4s to O10s, O1s to O3s, and W1s to W5s. This pattern was also consistent across CONUS and OCONUS regions. For the analyses, we weighted the data to reflect the proportional representation of respondents in the population (see Appendix B for additional details on weighting procedures).

Table 2.3 shows the distribution of survey respondents for sociodemographic subgroups. As can be seen, all subgroups had at least 140 or more respondents, most had

Table 2.2 Distribution of 1995 Survey Respondents, by Region and Pay Grade

Region/Pay Grade	Service: Army	Navy	Marine Corps	Air Force	Total DoD
CONUS[a]					
E1-E3	383	684	676	658	2,401
E4-E6	726	986	858	1,232	3,802
E7-E9	797	1,108	851	749	3,505
W1-W5	171	128	196	NA	495
O1-O3	233	285	329	262	1,109
O4-O10	341	336	299	413	1,389
Total	2,651	3,527	3,209	3,314	12,701
OCONUS[b]					
E1-E3	187	131	211	184	713
E4-E6	278	279	189	467	1,213
E7-E9	266	200	219	212	897
W1-W5	78	15	44	NA	137
O1-O3	98	53	43	70	264
O4-O10	80	60	45	83	268
Total	987	738	751	1,016	3,492
Total Worldwide					
E1-E3	570	815	887	842	3,114
E4-E6	1,004	1,265	1,047	1,699	5,015
E7-E9	1,063	1,308	1,070	961	4,402
W1-W5	249	143	240	NA	632
O1-O3	331	338	372	332	1,373
O4-O10	421	396	344	496	1,657
Total	3,638	4,265	3,960	4,330	16,193

Note: Table entries are numbers of respondents who completed a usable questionnaire.
NA = Not applicable.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 2.3 Distribution of 1995 Respondents, by Sociodemographic Characteristics

Sociodemographic Characteristic	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Sex					
Male	2,952	3,401	3,384	3,482	13,219
Female	686	864	576	848	2,974
Race/Ethnicity					
White	2,253	3,007	2,666	3,195	11,121
Black	853	559	648	611	2,671
Hispanic	307	299	451	279	1,336
Other	225	400	195	245	1,065
Education					
High school or less	847	1,610	1,769	878	5,104
Some college	1,725	1,665	1,340	2,305	7,035
College degree or beyond	1,066	990	851	1,147	4,054
Age					
20 or younger	350	399	488	368	1,605
21-25	761	836	1,048	1,058	3,703
26-34	1,004	1,232	895	1,276	4,407
35 or older	1,523	1,798	1,529	1,628	6,478
Marital Status					
Not married	1,229	1,437	1,471	1,376	5,513
Married	2,409	2,828	2,489	2,954	10,680
Pay Grade					
E1-E3	570	815	887	842	3,114
E4-E6	1,004	1,266	1,047	1,699	5,016
E7-E9	1,063	1,307	1,070	961	4,401
W1-W5	249	143	240	NA	632
O1-O3	331	338	372	332	1,373
O4-O10	421	396	344	496	1,657
Total Personnel	3,638	4,265	3,960	4,330	16,193

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

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

several hundred, and almost half had over 1,000 respondents. 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 1995 eligible respondent population. These estimates are based on data from the sample respondents who were weighted and poststratified to represent the eligible respondent population (see Appendix B for a discussion of weighting procedures). This eligible respondent population, which 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, accounted for nearly 90% of all active-duty personnel (see Table B.1 in Appendix B). Because the eligible respondent population omitted some personnel, their characteristics may differ somewhat from the characteristics of the total Active Force, although any fluctuations are expected to be relatively small. As shown in Table 2.4, the majority of personnel were males (87.6%), white (67.7%), educated beyond high school (63.2%), age 34 or younger (77.0%), married (60.3%), and in pay grades E1 to E6 (73.9%).

Inspection of Table 2.4 also shows some notable differences in demographic composition among the Services. The most striking contrasts occur between Marine Corps and Air Force personnel. Personnel in the Marine Corps compared to the Air Force were more likely to be male (95.4% vs. 84.1%); to be educated only through high school (57.8% vs. 21.2%); to be age 25 or younger (61.8% vs. 35.5%); to be unmarried (51.0% vs. 33.3%); and to be of junior pay grade E1 to E3 (37.3% vs. 16.9%). These differences are of interest because the demographics found in the Marine Corps correspond closely to those of personnel in prior surveys in this DoD series of surveys (e.g., Bray et al., 1988, 1992) who were more likely to engage in illicit drug use and heavy alcohol use (i.e., those who were male, younger, less well educated, unmarried, and in junior enlisted pay grades). These demographic differences suggest that the Marine Corps may face a greater challenge than the other Services in addressing substance use issues.

2.5 Key Definitions and Measures

2.5.1 Demographic Characteristics

The demographic characteristics considered in this report include sex, race/ethnicity, education, age, marital status, family status, pay grade, and region. Definitions for these different characteristics are described below.

Sex Sex is defined as male or female.

Table 2.4 Sociodemographic Characteristics of Eligible Respondent Population

Sociodemographic Characteristic	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Sex										
Male	86.9	(1.4)	88.7	(2.0)	95.4	(0.7)	84.1	(1.9)	87.6	(0.9)
Female	13.1	(1.4)	11.3	(2.0)	4.6	(0.7)	15.9	(1.9)	12.4	(0.9)
Race/Ethnicity										
White	62.0	(1.9)	67.6	(2.3)	67.9	(1.1)	74.2	(1.8)	67.7	(1.1)
Black	22.9	(1.7)	15.2	(1.5)	14.5	(1.1)	13.8	(1.4)	17.2	(0.8)
Hispanic	9.4	(0.6)	7.9	(1.0)	12.8	(1.1)	6.6	(0.7)	8.5	(0.4)
Other	5.8	(0.3)	9.3	(1.1)	4.8	(0.4)	5.4	(0.4)	6.6	(0.4)
Education										
High school or less	35.4	(3.0)	45.6	(2.2)	57.8	(3.4)	21.2	(1.5)	36.8	(1.3)
Some college	45.2	(1.7)	37.9	(1.6)	30.8	(2.4)	53.6	(2.7)	43.9	(1.0)
College degree or beyond	19.4	(3.0)	16.6	(2.4)	11.4	(1.6)	25.2	(3.5)	19.3	(1.6)
Age										
20 or younger	13.6	(1.0)	10.6	(0.5)	20.6	(2.0)	7.5	(0.5)	11.8	(0.5)
21-25	34.1	(2.3)	30.0	(2.2)	41.2	(2.7)	28.0	(1.5)	32.0	(1.1)
26-34	31.3	(1.1)	35.2	(1.3)	22.4	(1.6)	37.4	(0.7)	33.2	(0.6)
35 or older	21.1	(2.5)	24.2	(1.3)	15.7	(2.4)	27.0	(1.4)	23.1	(1.0)
Marital Status										
Not married	41.9	(1.7)	39.4	(2.3)	51.0	(2.5)	33.3	(1.0)	39.7	(1.0)
Married	58.1	(1.7)	60.6	(2.3)	49.0	(2.5)	66.7	(1.0)	60.3	(1.0)
Pay Grade										
E1-E3	20.9	(1.9)	21.5	(1.7)	37.3	(3.7)	16.9	(1.0)	21.7	(1.0)
E4-E6	51.9	(2.5)	55.6	(2.4)	43.3	(2.0)	52.4	(2.9)	52.2	(1.4)
E7-E9	11.0	(1.2)	9.7	(0.9)	8.6	(1.3)	11.2	(0.5)	10.4	(0.5)
W1-W5	2.3	(0.5)	0.6	(0.1)	1.3	(0.2)	NA	(NA)	1.0	(0.2)
O1-O3	8.0	(1.1)	7.6	(1.1)	6.0	(0.8)	11.7	(2.2)	8.7	(0.8)
O4-O10	5.9	(1.6)	4.9	(1.1)	3.5	(0.9)	7.7	(1.6)	5.9	(0.8)
Total Personnel	31.9	(1.7)	28.8	(1.8)	11.0	(0.6)	28.4	(1.3)	100.0	(NA)

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

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Race/ Ethnicity — Following the current U.S. Bureau of the Census classification, personnel are grouped into four racial/ethnic groups. Personnel referred to as "white, non-Hispanic" are those who reported that they are "white," but "not of Hispanic origin." Personnel referred to as "black, non-Hispanic" are those who reported being "black," but "not of Hispanic origin." "Hispanic" includes anyone of Hispanic origin—whether racially black, white, or other. The category "other" includes all other persons not elsewhere classified.

Education — Education refers to the highest level of education attained. Categories include high school or less, some college, and college graduate or higher. Personnel with General Equivalency Diplomas (GEDs) were treated as high school graduates.

Age — Age of respondents is defined as age at the time of the survey. For several of the analyses presented in this report, estimates are presented for the following age groups: personnel aged 20 or younger, personnel aged 21 to 25, personnel aged 26 to 34, and personnel aged 35 or older.

Marital Status — Marital status categories presented in this report are "not married" (including personnel who were single, widowed, divorced, or separated), and "married" (including personnel who were married or living with someone in a marriage-like relationship).

Family Status — Family status is defined in terms of respondents' marital status, and for respondents who were married (or living as married), whether their spouses were present at the respondents' current duty assignments. For respondents who were living with someone in a marriage-like relationship, "spouse" referred to the person they were living with in that relationship.

Pay Grade — Pay grade categories for enlisted personnel are E1 to E3, E4 to E6, and E7 to E9. Pay grade categories for officers and warrant officers are O1 to O3, O4 to O10, and W1 to W5.

Region — Region refers to the installation where personnel were stationed at the time of the survey and includes installations in the 48 contiguous States within the continental United States (CONUS), and installations outside the continental United States (OCONUS).

2.5.2 Reference Periods

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

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

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

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

However, some estimates related to specific *Healthy People 2000* objectives (PHS, 1991) refer to a time period other than the ones listed above. In these situations, the time period refers to that length of time prior to the survey. For example, the "past 5 years" refers to the 5-year period preceding the survey.

2.5.3 Substance Use Measures

Measures of substance use for the 1995 DoD survey are consistent with those used in prior surveys in this series and with those in major national surveys, such as the National Household Survey on Drug Abuse (NHSDA). We measured alcohol use in this study in terms of the quantity of alcohol consumed and frequency of drinking. We have expressed alcohol use in summary form as the average number of ounces of absolute alcohol (ethanol) consumed per day and as drinking levels. We computed the ethanol index following the method used in the 1982 to 1992 DoD surveys (Bray et al., 1983, 1986, 1988, 1992) and the Rand study of alcohol use among Air Force personnel (Polich & Orvis, 1979). The ethanol index is a function of (a) the amount of ethanol contained in the ounces of beer, wine, and hard liquor consumed on a typical drinking day during the past 30 days; (b) the frequency of use of each beverage; and (c) the amount of ethanol consumed on atypical ("heavy") drinking days during the past 12 months. The index represents average daily ounces of ethanol consumed during a 12-month period. Although we have expressed the index in terms of 12-month use, most of the data come from reports of 30-day typical use. Appendix E provides additional details about the procedures for creating this index.

The drinking levels classification scheme used in the 1995 DoD survey was adapted from Mulford and Miller (1960) and followed the method used in prior DoD surveys (Bray et al., 1983, 1986, 1988, 1992). We 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 individuals into 1 of the 10 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. Heavy drinkers, the category of most concern, is defined as drinking five or more drinks per typical drinking occasion at least once a week in the 30 days prior to the survey. The criterion of five or more drinks to define heavy drinkers is consistent with the definition used in other national surveys of civilians, such as the NHSDA (SAMHSA, 1995a) and Monitoring the Future (Johnston, O'Malley, & Bachman, 1994a, 1994b). Additional details about the procedures for creating the drinking levels classification scheme are described in Appendix E.

We also estimated the prevalence of adverse effects associated with alcohol use in the past 12 months. We created three summary measures of alcohol-related negative effects: serious consequences, productivity loss, and dependence symptoms. The measure

of alcohol-related "serious consequences" refers to the occurrence of one or more of the following problems in the past 12 months: UCMJ (Uniform Code of Military Justice) punishment, loss of 1 week or more from duty because of a drinking-related illness, alcohol-related injury, spouse left, arrests for DWI (driving while impaired) or other incidents, incarceration, fights, not getting promoted, and needing detoxification.

The measure of alcohol-related "productivity loss" refers to one or more occurrences in the past 12 months of being late for work or leaving early, not coming to work at all, being drunk at work, or performing below a normal level of productivity because of alcohol use or the aftereffects or illness resulting from drinking.

The summary measure of "dependence symptoms" is based on the occurrence in the past 12 months of withdrawal symptoms (e.g., the "shakes"), inability to recall things that happened while drinking, inability to stop drinking before becoming drunk, and morning drinking. Respondents reported the number of days that they experienced these symptoms during the past 12 months, and we summed these frequencies over the four symptoms. Individuals with scores of 48 or more were classified as dependent. Our measure of dependence symptoms is based on the Rand Air Force study definition (Polich & Orvis, 1979) that has been used in prior surveys in the DoD survey series. This definition does not reflect the strict definition of dependence used in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA, 1994), but it was used here to permit comparisons with data from prior surveys in this DoD series.

We measured illicit drug use in this study in terms of the prevalence of nonmedical use of any of 12 categories of drugs: marijuana/hashish, phencyclidine (PCP), lysergic acid diethylamide (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, and anabolic steroids. We made no attempt to 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 prior DoD 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).

Most analyses of tobacco focus on cigarette smoking. We defined "current smokers" as those who smoked at least 100 cigarettes during their lifetime and who last smoked a cigarette 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 in terms of whether they were lifetime smokers (i.e., smoked at least 100 cigarettes lifetime, but did not smoke in the past 30 days) or nonsmokers (smoked fewer than 100 cigarettes lifetime).

The 1995 survey also measured the prevalence of use of other forms of tobacco use besides cigarettes (cigars, pipes, smokeless tobacco). "Current" users of smokeless tobacco were defined as personnel who used smokeless tobacco products (i.e., chewing tobacco or snuff) at least 20 times during their lifetime and who last used smokeless tobacco during the past 30 days.

2.5.4 Other Health Behaviors

A major emphasis of the 1995 DoD survey was the investigation of health behaviors of military personnel other than use of alcohol, illicit drugs, or tobacco. In particular, we measured the following health behaviors or factors related to specific *Healthy People 2000* objectives:

- overweight and exercise,
- high blood pressure screening and control,
- high cholesterol screening,
- hospitalization for injuries,
- seat belt use,
- helmet use,
- condom use by sexually active unmarried personnel,
- receipt of Pap smears, and
- substance use during pregnancy.

An index of overweight was defined in terms of the Body Mass Index (BMI), where BMI is weight (in kilograms) divided by the square of height (in meters). Using the BMI criteria for overweight from *Healthy People 2000*, military men were defined as overweight if they were under age 20 and had a BMI of 25.8 or greater, or if they were aged 20 or older and had a BMI of 27.8 or greater. Military women were defined as overweight if they were under age 20 and had a BMI of 25.7 or greater, or were aged 20 or older and had a BMI of 27.3 or greater.

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

2.5.5 Mental Health

For the first time, the 1995 DoD survey included an expanded set of questions on mental health issues, including

- levels of stress at work and in family life,
- sources of stress,
- behaviors for coping with stress,
- perceived quality of mental health, and
- symptoms of depression.

Measures for most of these items were based on responses to specific questions. In addition, an index of Need for Further Assessment for Depression was constructed based on reports of an extended period of depression, primarily in the past 12 months. Personnel were defined as needing further assessment if they (a) felt sad, blue, or depressed for 2 weeks or more in the past 12 months, or reported 2 or more years in their lifetime of feeling depressed and felt depressed "much of the time" in the past 12 months; *and* (b) felt depressed on 1 or more days in the past week. This index was based on work by Rost, Burnam, and Smith (1993).

2.6 Analytical Approach

The focus of our analyses of the 1995 DoD survey was to provide knowledge about current levels of substance use and health behaviors, negative effects associated with alcohol use, and trends in these behaviors throughout the survey series. In addition, analyses provide baseline estimates of selected *Healthy People 2000* objectives. These analyses 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 five basic types of analyses within this study:

- descriptive univariate and bivariate analyses of the prevalence of substance use, negative consequences, health behaviors, and selected *Healthy People 2000* objectives in 1995;

- comparisons of trends in substance use and negative effects from 1980 to 1995 (including standardized comparisons of substance use to control for changes in demographic composition);
- standardized comparisons of the extent of substance use among personnel in the four active Services in 1995;
- standardized comparisons of military and civilian rates of substance use; and
- multivariate logistic regression analyses.

Most of our analyses were descriptive cross-tabulations of the responses from two or more variables. We assessed significant differences for these data using *t* tests.

An important part of the analyses we conducted for this study was the comparison of trends across the series of DoD surveys. Comparing substance use over time is useful, but researchers and policymakers should recognize the limitations of such analyses in drawing policy conclusions. The data from the DoD survey series are cross-sectional, not longitudinal, and come from different populations due to the high turnover among military personnel. Many individuals serving in the Military in 1980, 1982, 1985, 1988, and 1992 (years when the surveys were administered) were no longer in the Military in 1995. Thus, analysts must use caution in making inferences about reasons for the observed changes in rates of substance use, health behaviors, or problems. The changes may be due, in part, to effective substance use and health promotion programs and other health-related policies in the Military, but they may also be due, in part, to differences in sociodemographic characteristics, attitudes, and values of the populations being surveyed.

In particular, changes in substance use patterns may have been due in part to changes in the sociodemographic composition of the Military since 1980. The Active Force is now somewhat older, has more officers, has more married personnel, and is better educated than in 1980--factors that in previous DoD surveys have been associated with a lower likelihood of substance use. Therefore, we used the technique of direct standardization (Kalton, 1968) described in Appendix F to create adjusted estimates of heavy alcohol, other drug, and cigarette use for each of the survey years since 1980. These adjustments provide an indication of the expected substance rates if the military population in each of these subsequent survey years had the same age, educational, and marital status distribution as in 1980. In Chapters 3 to 6, we present both adjusted and unadjusted rates (i.e., observed rates) of substance use across the survey years of the average daily number of ounces of ethanol consumed, heavy drinking, illicit drug use, and cigarette smoking. Adjusted estimates are constructed estimates that allow us to determine whether observed changes in substance use rates over the past 15 years can be explained by changes in the demographic composition of the Services. Unadjusted or "raw" estimates are the *observed* substance use rates and identify the 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 among the Services 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 tended to be older and better educated than personnel in the other Services at the time of the survey. Because these characteristics are associated with lower rates of substance use, all other things being equal, we would expect the prevalences of heavy drinking, drug use, and smoking to be lower in the Air Force than in the other Services. Comparisons of efforts by the Services to combat substance abuse must consider demographic differences in risk factors. To take into account the sociodemographic differences among Services, we computed a second set of adjusted estimates. As with the approach described above, we used direct standardization (Kalton, 1968) to adjust the 1995 prevalence rates for each Service and 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.

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

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

2.7 Variability and Suppression of Estimates

Table 2.4 and other tables in the following chapters generally present two numbers in each cell. The first number is an estimate of the percentage of the population with the characteristics that define the cell. The second number, in parentheses, is the standard error of the estimate. Standard errors represent the degree of variation associated with observing a sample rather than observing every member of the population.

Confidence intervals, or ranges that are very likely to include the true population value, can be constructed using standard errors. 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 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 (**).

2.8 Strengths and Limitations of the Data

Self-reports in which respondents provide data about their behaviors rely on respondents' veracity to provide correct information about observations and events. Surveys have been a major vehicle for obtaining self-report data about a wide variety of behaviors, including substance use and health behaviors. A major strength of the 1995 DoD survey is that it permits the collection of a rich array of information about the nature and extent of behaviors of interest along with information about correlates of these behaviors. Other strengths of the 1995 DoD survey include the use of sophisticated sampling techniques and widely used questionnaire items that allow for precise estimates of substance use and health behaviors for well-defined populations and permit assessment of trends over time.

Despite these strengths, survey results are also subject to the potential bias of self-reports and to the ambiguities caused by questions with varying interpretations. In addition, there are other potential problems with the validity of survey data, including issues of population coverage and response rates. If the population is not properly represented in the survey or if responses rates are low, biases are introduced that can invalidate the survey results. We believe that the design and field procedures of the 1995 DoD survey adequately addressed most of these concerns. A pretest was used to identify and eliminate ambiguities in question wording, the active-duty population was properly represented in the study, and the response rate was within an acceptable range (although somewhat lower than for past DoD surveys). Further, a nonresponse adjustment was made to help compensate for the potential bias of nonsurveyed persons.

Many individuals question the validity of self-reported data on sensitive topics, such as alcohol and drug use, claiming that survey respondents will give socially desirable rather than truthful answers. This issue was of concern for the 1995 survey because of the ongoing 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; Lemmens, Tan, & Knibbe, 1992; Midanik, 1982; Smith, Remington, Williamson, & Anda, 1980;
- *drug use* (Haberman, Josephson, Zanes, & Elinson, 1972; Harrison, 1995; Kandel & Logan, 1984; O'Malley, Bachman, & Johnston, 1983; Rouse, Kozel, & Richards, 1985); and
- *delinquent behavior among adolescents* (Blackmore, 1974; Doleschal, 1970; Elliott & Huizinga, 1984; Erickson & Empey, 1963; Gibson, Morrison, & West, 1970; Gold, 1966; Gould, 1969; Hindelang, Hirschi, & Weiss, 1981; Williams & Gold, 1972).

Overall, the various reviews of the literature are encouraging in suggesting that self-reports on alcohol use, drug use, and delinquent behavior are generally reliable and valid.

Additional information about the validity of self-reports on drug use is addressed by Harrison (1995) and in a monograph by Rouse et al. (1985). A general conclusion emerging from these various reviews is that most people appear to be truthful (within the bounds of capability) under the proper conditions. Such conditions include believing that the research has a legitimate purpose, having suitable privacy for providing answers, having assurances that answers will be kept confidential, and believing that those collecting the data can be trusted (Harrison, 1995; Johnston & O'Malley, 1985). Throughout the DoD 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 1995 DoD 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 and into the 1990s (Captain John Jemionek, Office of Department of Defense Coordinator for Drug Enforcement Policy and Support, personal communication, November 29, 1995)..

3. OVERVIEW OF TRENDS IN SUBSTANCE USE AND BASELINE MEASURES FOR *HEALTHY PEOPLE 2000* OBJECTIVES

In this chapter, we provide a brief overview of the prevalence of alcohol use, illicit drug use, and tobacco use from the 1995 DoD survey and examine the trends in substance use and negative effects due to alcohol use from 1980 to 1995. We also provide baseline data for 17 *Healthy People 2000* objectives for military personnel that were amenable to measurement using survey data, 13 of which apply to all personnel, and the remaining 4 that are specific to military women. Our focus in this chapter is on data across all Services for the entire DoD. These findings are considered in more detail in later chapters both within and across the individual Services. Information is also provided in later chapters on correlates of substance use, relationships of substance use to physical and mental health, health risk behaviors, comparisons with civilian data, special health issues for military women, and other topics.

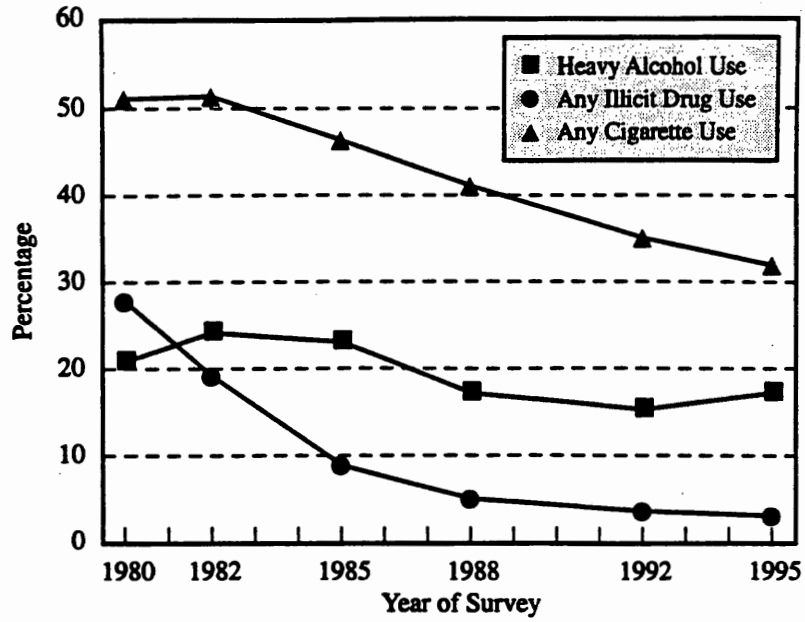
3.1 Trends in Substance Use

In this section, we present two types of estimates, unadjusted and adjusted prevalence rates. Unadjusted data are the observed rates reported in the surveys of the DoD series from 1980 to 1995 and reflect the circumstances facing the Services in reducing substance abuse. Adjusted rates, on the other hand, are constructed rates that have been modified to take into account changes in the sociodemographic composition of the Services since the survey series began in 1980. Military personnel in 1995 on average 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. Thus, adjusted rates help address the question of whether changes reflected in the trends are due primarily to shifts in military demographics.

3.1.1 Unadjusted Trends in Substance Use

Figure 3.1 presents the trends over the six DoD surveys of the percentage of the total Active Force during the past 30 days who engaged in heavy alcohol use, any illicit drug use, and any cigarette use. Table 3.1 presents the observed rates of use of the three substances for the six survey years and information about the statistical significance of changes in substance use between each pair of survey years. In addition, Table 3.1 shows the distribution of alcohol prevalence among drinking levels across the survey years. As shown, any alcohol use, heavy alcohol use, illicit drug use, and cigarette use all declined significantly between 1980 and 1995, although the rate of decline varied for each of the substances and between each of the six surveys.

Figure 3.1 Trends in Substance Use, Past 30 Days, Total DoD, 1980-1995



Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

The prevalence of heavy alcohol use declined significantly from 20.8% for all military personnel in 1980 to 17.1% in 1995. When we examine the trend over each of the six 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 1995. Thus, heavy drinking declined significantly from 1980 to 1995, but has been relatively stable since 1988.

The prevalence of any illicit drug use during the past 30 days declined sharply from 27.6% in 1980 to 3.0% in 1995. The rate of decrease was much greater than for heavy alcohol use, and the decreases were statistically significant between each of the surveys from 1980 to 1992, but showed no significant change between 1992 and 1995.

Examination of drinking levels shows that across the survey years, the majority of military personnel used alcohol at some level. For example, in 1995, 78.9% of the total DoD drank alcohol in the past 30 days. These data also show a pattern from 1980 to 1995 of a general increase in the proportion of personnel who abstained from alcohol or who were light/infrequent users and corresponding decreases in the proportions of moderate, moderate/heavy, and heavy drinkers. The percentage of people who abstained from alcohol or who were infrequent/light drinkers increased from 25.6% in 1980 to 39.7% in 1995.

Table 3.1 Substance Use Summary for Total DoD, 1980-1995

Measure	Year of Survey					
	1980	1982	1985	1988	1992	1995
Alcohol Drinking Levels						
Abstainer	13.5 (0.5)	11.8 (0.5)[a]	13.4 (0.6)[a]	17.2 (0.4)[a]	20.4 (0.8)[a]	21.1 (0.5)[b]
Infrequent/light	12.1 (0.4)	17.6 (0.8)[a]	16.6 (0.7)	17.5 (0.5)	18.8 (0.5)	18.6 (0.6)[b]
Moderate	21.2 (0.7)	17.0 (0.5)[a]	18.6 (0.6)[a]	19.5 (0.5)	19.5 (0.5)	18.9 (0.5)[b]
Moderate/heavy	32.4 (0.6)	29.6 (0.6)[a]	28.5 (0.8)	28.8 (0.7)	26.1 (0.6)[a]	24.2 (0.6)[b]
Heavy	20.8 (1.1)	24.1 (1.0)[a]	22.9 (1.1)	17.0 (0.9)[a]	15.2 (0.7)	17.1 (0.8)[b]
Any Illicit Drug Use						
Past 30 days	27.6 (1.5)	19.0 (1.0)[a]	8.9 (0.8)[a]	4.8 (0.3)[a]	3.4 (0.4)[a]	3.0 (0.3)[b]
Past 12 months	36.7 (1.5)	26.6 (1.0)[a]	13.4 (1.0)[a]	8.9 (0.8)[a]	6.2 (0.6)[a]	6.5 (0.5)[b]
Cigarette Use, Past 30 Days						
Any smoking	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[a,b]
Heavy smoking	34.2 (0.6)	33.5 (0.7)	31.2 (0.8)[a]	22.7 (0.7)[a]	18.0 (0.5)[a]	15.0 (0.6)[a,b]
Alcohol Use Negative Effects, Past 12 Months						
Serious consequences	17.3 (1.1)	14.6 (0.6)[a]	10.7 (0.9)[a]	9.0 (0.6)	7.6 (1.1)	7.6 (0.5)[b]
Productivity loss	26.7 (1.2)	34.4 (0.7)[a]	27.1 (1.1)[a]	22.1 (1.2)[a]	16.4 (1.4)[a]	16.3 (0.8)[b]
Dependence	8.0 (0.6)	9.0 (0.5)	7.7 (0.7)	6.4 (0.5)	5.2 (0.4)	5.7 (0.4)[b]

Note: Entries are percentages (with standard errors in parentheses). Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 1995. Definitions and measures of substance use and alcohol use negative effects are given in Section 2.5.3.

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

[b]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

The percentage of military personnel who smoked cigarettes in the past 30 days also decreased during the 15-year period, from 51.0% in 1980 to 31.9% in 1995. Smoking rates showed no significant change between 1980 and 1982, but decreased significantly between each of the later surveys, including between 1992 and 1995. Despite clear progress in reducing the prevalence of smoking, the 1995 rate is considerably higher than the *Healthy People 2000* objective of 20% adopted for the Military (PHS, 1991).

Considered together, the trend data on substance use are notable in several regards. The first is that the three substances show statistically significant reductions in use across the total time period between 1980 and 1995. This indicates that the Military has made progress in reducing use of all three substances over the past decade and a half.

The second observation is that only cigarette smoking declined significantly between 1992 and 1995, whereas heavy drinking and illicit drug use did not. Nonetheless, smoking rates still remain the highest of the three substances, nearly twice as high as heavy drinking and over 10 times higher than illicit drug use. In 1995, roughly one out of three military personnel were current smokers, a rate notably higher than the *Healthy People 2000* objective of 20% adopted for the Military.

The third observation is that the lack of a significant decline from 1992 to 1995 in heavy drinking suggests that this is an area that may need greater emphasis by the Military. Indeed, the 1995 rate of heavy drinking had not changed significantly since 1988 and indicates that slightly more than one out of six military personnel was likely to be a heavy drinker. Despite the lack of change in the rate of heavy drinking since 1988, Table 3.1 indicates that there was an overall shift from moderate and heavier levels of drinking to infrequent/light levels.

Finally, the finding of no significant reduction in illicit drug use between 1992 and 1995 and the relatively low rates of use for both surveys suggests that illicit use may have reached its lower limit. The trend line resembles an asymptotic curve that shows steep declines initially with successively smaller declines until it eventually flattens out. The 1995 data suggest that the flattening point may have been reached and that it may not be realistic to expect drug use among military personnel to go much lower.

3.1.2 Trends in Substance Use Adjusted for Sociodemographic Differences

To examine whether changes in demographic composition explain the pattern of results, we used direct standardization methods to adjust the rates of use for the 1982, 1985, 1988, 1992, and 1995 surveys to the age/education/marital status distribution for the 1980 survey respondents (see Appendix F for a discussion of standardization methods and the rationale for demographic variables used for the adjustment). Adjusted rates are not actual prevalence estimates, but rather are

constructed estimates that show how the rates would have looked if there had been no changes in the demographic characteristics of the Military from 1980 to 1995.

In Table 3.2, we present the trends in unadjusted (i.e., observed) and adjusted (i.e., standardized) rates of heavy drinking, any illicit drug use, and cigarette smoking for the total DoD during the six 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 1995. For heavy alcohol use, adjusted rates increased the estimates of heavy drinking by about one to three percentage points for the 1982 to 1995 surveys. That is, if the sociodemographic composition of the Military in later years 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 over the total time period between 1980 and 1995, although there was for unadjusted rates. Indeed, the 1980 and 1995 adjusted rates are nearly identical (20.8% and 20.1%, respectively).

The finding of no significant difference in adjusted rates suggests that military programs and practices have had little effect on rates of heavy drinking during the 15-year period from 1980 to 1995. 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 1995 than in 1982. This could be interpreted to mean that the Military made significant progress in reducing heavy drinking during the period, from 23.6% in 1982 to 20.1% in 1995 (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 1995 were about the same as they were in 1980.

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 1995. 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 1995.

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	1995
Heavy Drinking						
Unadjusted	20.8 (1.1)	24.1 (1.0)[a]	22.9 (1.1)	17.0 (0.9)[a]	15.2 (0.7)	17.1 (0.8)[c]
Adjusted[b]	20.8 (1.1)	23.6 (0.9)[a]	24.0 (0.8)	19.3 (0.9)[a]	18.9 (0.9)	20.1 (0.8)
Any Illicit Drug Use						
Unadjusted	27.6 (1.5)	19.0 (1.0)[a]	8.9 (0.8)[a]	4.8 (0.3)[a]	3.4 (0.4)[a]	3.0 (0.3)[c]
Adjusted[b]	27.6 (1.5)	18.2 (0.7)[a]	9.7 (0.6)[a]	5.6 (0.4)[a]	4.3 (0.6)	3.6 (0.4)[c]
Cigarette Use						
Unadjusted	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[c]
Adjusted[b]	51.0 (0.8)	52.0 (0.6)	47.5 (0.9)[a]	42.9 (0.7)[a]	37.2 (0.8)[a]	34.3 (0.6)[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 1995. Definitions and measures of substance use are given in Section 2.5.3.

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

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

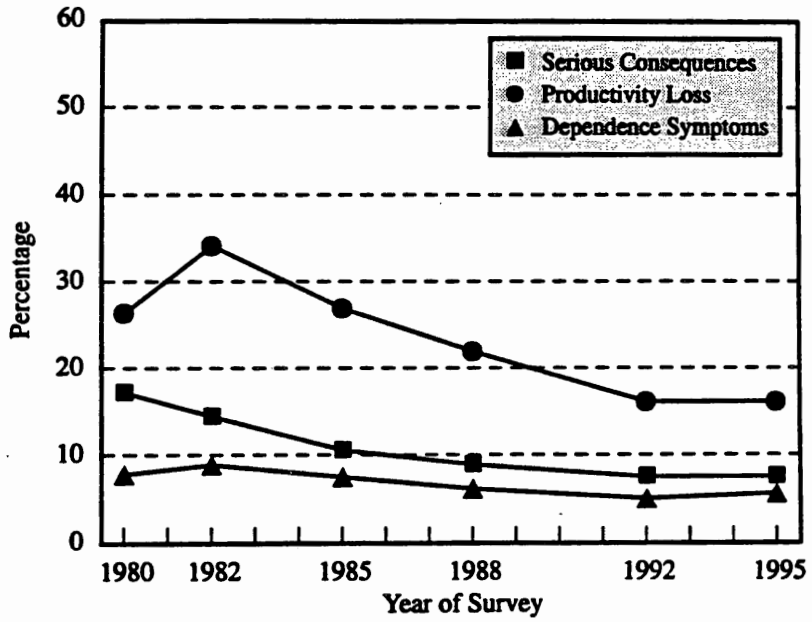
[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

3.1.3 Trends in Alcohol-Related Negative Effects

The substantial negative consequences of alcohol use on the work performance, health, and social relationships of military personnel have been a continuing concern assessed in the DoD surveys. In Figure 3.2 and Table 3.1 (shown earlier), we present trends in alcohol-related negative effects for the total DoD between 1980 and 1995. In view of the decline in heavy drinking between 1980 and 1995 (unadjusted rates) 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 1995, the same rate observed for 1992. In Figure 3.2, results for serious consequences show a steady downward decline from 1980 to 1985 with more gradual declines and a leveling off since then. The 1980 to 1995 decrease was statistically significant, as were the decreases between 1980 and 1982 and between 1982 and 1985. Declines since 1985 were more moderate and were not significantly different from those of the preceding survey year.

Figure 3.2 Trends in Alcohol Use Negative Effects, Past 12 Months, Total DoD, 1980-1995



Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Alcohol use productivity loss, also shown in Figure 3.2, decreased significantly between 1980 and 1995, from 26.7% to 16.3%. 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 from 1982 to 1992, but no change from 1992 to 1995. The 1995 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 15-year period. In 1980, as shown in Figure 3.2, 8.0% of total DoD personnel indicated that they had experienced symptoms of dependence during the past year compared to 5.7% in 1995. Despite the significant decrease, the curve looks relatively flat over the years, with about 6% reporting alcohol dependence symptoms since 1988 during the past three surveys.

3.2 Baseline Measures for *Healthy People 2000* Objectives

A major aim of the 1995 DoD survey was to develop baseline estimates to measure progress toward selected *Healthy People 2000* objectives for a variety of health behaviors. In addition to the objective already discussed above for reducing cigarette smoking to a prevalence of 20% or less, the objectives that were measured included the following:

1. reduce smokeless tobacco use by males aged 24 or younger to a prevalence of no more than 4%;

2. reduce overweight, as measured by the Body Mass Index (BMI) to a prevalence of no more than 15% among people under age 20, and to no more than 20% among people aged 20 or older;

3. increase to at least 20% the proportion of people aged 18 or older who engage in vigorous physical activity 3 or more days per week for 20 or more minutes per occasion;

4. increase 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;

5. increase to at least 90% the proportion of people with high blood pressure who are taking action to help control their blood pressure;

6. increase to at least 75% the proportion of adults who had their blood cholesterol checked within the preceding 5 years;

7. reduce nonfatal unintentional injuries that require hospitalization to no more than 754 per 100,000 people;

8. increase the use of occupant protection systems, such as safety belts, inflatable safety restraints, and child safety seats, to at least 85% of motor vehicle occupants;

9. increase the use of helmets to at least 80% of motorcyclists and at least 50% of bicyclists;

10. increase to more than 50% the proportion of sexually active, unmarried people who used a condom at last sexual intercourse;

11. increase to at least 95% the proportion of women aged 18 or older with an intact uterine cervix who have ever received a Pap test, and to at least 85% those who received a Pap test within the preceding 3 years; and

12. increase abstinence from tobacco use by pregnant women to at least 90% and increase abstinence from alcohol by at least 20%.

The objectives noted here are the ones for which the 1995 survey provides baseline measures. In this section, we describe overall findings from the total DoD for these objectives. Chapter 6 gives additional details about objective 1 on smokeless tobacco use. Chapter 7 discusses objectives 2 to 6 on cardiovascular disease risk reduction, objectives 7 to 9 on injuries and injury prevention, and objective 10 on sexually transmitted disease (STD) risk reduction. Chapter 9 examines objectives 11 and 12, which are specific to Military women, regarding Pap smears and reduction of substance use during pregnancy.

3.2.1 Smokeless Tobacco Use (Objective 1)

Table 3.3 presents the first 10 *Healthy People 2000* objectives and corresponding baseline data for DoD personnel combined across all Services. As shown, for objective 1 on smokeless tobacco use in the past 30 days, military personnel showed a prevalence of 21.9%. This rate, over 5 times higher than the objective of 4%, is consistent with the prevalence of cigarette smoking discussed earlier (32%), which also was notably higher than the objective (20%). Given the rather large disparity between the smokeless tobacco and smoking rates and the *Healthy People 2000* goals, the Military faces a considerable challenge to reduce smokeless tobacco use to the targeted levels by the year 2000.

3.2.2 Overweight (Objective 2)

Consistent with the definition of overweight used in *Healthy People 2000*, estimates of the prevalence of overweight in Table 3.3 were based on the Body Mass Index (BMI), defined as the ratio of a person's weight in kilograms to the square of that person's height in meters. As shown in Table 3.3, 19.0% of all military personnel under the age of 20 were classified as overweight, and 16.7% of personnel aged 20 or older were defined as overweight according to the BMI. Thus, personnel in the total DoD under the age of 20

Table 3.3 Baseline Measures for *Healthy People 2000* Objectives, Total DoD, 1995

Characteristic/ Group	Objective	Total DoD
Smokeless tobacco use, past 30 days		
Males, ages 18-24	≤ 4%	21.9 (1.0)
Overweight[a]		
Under age 20	≤ 15%	19.0 (1.4)
Ages 20 or older	≤ 20%	16.7 (0.4)
Strenuous exercise, past 30 days[b]		
All personnel	≥ 20%	65.4 (0.9)
Blood pressure, checked past 2 years and know result		
All personnel	≥ 90%	76.3 (0.9)
Taking action to control high blood pressure[c]		
Personnel with history of high blood pressure	≥ 90%	49.3 (1.3)
Cholesterol checked, past 5 years		
All personnel	≥ 75%	60.1 (1.5)
Hospitalization for injuries, past 12 months		
All personnel	≤ 754 per 100,000	3,388 (235)
Seat belt use[d]		
All personnel	≥ 85% of occupants	90.6 (0.7)
Helmet use, past 12 months[d]		
Motorcyclists	≥ 80%	71.0 (1.3)
Bicyclists	≥ 50%	22.8 (1.8)
Condom use at last encounter		
Sexually active unmarried personnel[e]	≥ 50%	40.4 (1.0)

Note: Entries are expressed as percentages (with standard errors in parentheses), except for hospitalization for injuries, which is expressed per 100,000 personnel.

[a]Defined in terms of the Body Mass Index (BMI), where BMI = (Weight in kilograms) ÷ (Height in meters)^2. Personnel under age 20 were defined as overweight if BMI ≥ 25.8 for men or BMI ≥ 25.7 for women. Personnel aged 20 and older were defined as overweight if BMI ≥ 27.8 for men or BMI ≥ 27.3 for women.

[b]One or both of the following three or more times a week for 20 minutes or more: running/cycling/walking, or other strenuous exercise.

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

[d]Reported wearing seat belts or helmets "always" or "nearly always." Objectives on helmet use were subsetted to personnel who rode a motorcycle or bicycle in the past 12 months.

[e]Defined as unmarried personnel who had one or more sexual partners in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

were somewhat above the objective of no more than a 15% prevalence of overweight, whereas personnel aged 20 or older had met the goal of 20% prevalence of overweight.

It is somewhat surprising that military personnel under age 20 would be below the *Healthy People 2000* objective whereas those over age 20 would not, given the strong emphasis on fitness in the Military. It is possible that the BMI may overestimate somewhat the percentages of military personnel who are overweight. Specifically, some BMI measurements among military personnel that are over the threshold for classifying someone as overweight may be due to increased muscle mass, rather than to excess body fat. Thus, some of these personnel classified as overweight may still have had percentage body fat measurements within acceptable ranges for their Services. Alternatively, some junior personnel as they entered the Military may have been somewhat, though not excessively, above the weight standard and it may simply take a period of time in the Military for them to "get into shape."

3.2.3 Exercise (Objective 3)

Objective 3 examines personnel who engaged in strenuous exercise at least 3 days per week for at least 20 minutes per occasion in the past 30 days. As shown in Table 3.3, nearly two-thirds of personnel in the total DoD reported meeting this requirement, which far exceeds the *Healthy People 2000* objective of 20% or greater for the general adult population. Given the emphasis that the Military places on physical fitness as part of an overall goal of military readiness, this finding is not surprising.

3.2.4 Blood Pressure (Objectives 4 and 5)

Table 3.3 presents findings on percentages of personnel who had their blood pressure checked in the 2 years prior to the survey who were also aware of the result. We classified personnel as *not* meeting these criteria if they (a) last had their blood pressure checked more than 2 years before the survey, (b) could not recall when they last had their blood pressure checked, or (c) were not aware of the result of their last blood pressure check, even if it occurred in the past 2 years. Because some personnel may have had their blood pressure checked in the past 2 years but could not recall when they last had it checked, our estimates may be somewhat conservative. Overall, 76.3% of total DoD personnel had their blood pressure checked in the past 2 years and could state the result. This rate was somewhat lower than the *Healthy People 2000* target of 90%.

We also gathered data about the group of people who had high blood pressure who were taking positive steps to control it, either through physical activity, diet, lifestyle changes, or medication. We developed our measure based on the structuring of blood pressure control questions in the National Health Interview Survey (NHIS). As shown, 49.3% of all military personnel who had a lifetime history of high blood pressure were taking one or more recommended actions to control it at the time of the 1995 DoD survey.

Although this number indicates that about half of military personnel were consciously taking steps to control their high blood pressure, it falls considerably short of the 90% level, which is the *Healthy People 2000* objective. It is possible that some of these personnel may not have been taking any action to control their blood pressure if their blood pressure had returned to normal. Nevertheless, those personnel who had a history of high blood pressure but were not taking any of these actions to control their high blood pressure are a group at increased risk for a recurrence of the problem.

3.2.5 Cholesterol (Objective 6)

As shown in Table 3.3, approximately 60% of all personnel in the total DoD had their cholesterol checked within the preceding 5 years. This rate was somewhat lower than the *Healthy People 2000* target of 75% for adults. Although the Military was below the goal, part of the reason may be related to military regulations that specify age-dependent screening criteria. Woodruff and Conway (1991), for example, noted that Navy regulations do not require personnel under the age of 25 to be screened for blood cholesterol level, whereas they do require that personnel between the ages of 25 and 49 have their cholesterol checked once every 5 years and that personnel between the ages of 50 and 59 have theirs checked once every 2 years. Chapter 7 presents additional analyses that examine age-specific screening rates and show that the goal has been achieved in some subgroups, but not overall. In view of age-specific regulations, it may be advisable for the DoD to set its own targets for the Military, at least for cholesterol, rather than relying on the targets for civilians.

3.2.6 Injuries and Injury Prevention (Objective 7)

Table 3.3 also presents estimates of the prevalence of hospitalization for treatment of injuries in the 12 months prior to the survey. Unlike the other estimates in this table, which are expressed as percentages, the estimate for hospitalization is presented as the number of personnel hospitalized for treatment of injuries per 100,000 active-duty personnel. Analyses of the 1995 survey showed that approximately 3,400 active-duty military personnel were hospitalized for treatment of an injury in the past 12 months, a number that was about 4.5 times higher than the *Healthy People 2000* target of 754 per 100,000 people. This finding suggests the need for further research on injuries among military personnel to gain a better understanding of possible reasons underlying their notably higher rates of hospitalization for injuries and ways to reduce it.

3.2.7 Seat Belt Use (Objective 8)

Table 3.3 shows that 90.6% of the total DoD personnel wore seat belts "always" or "nearly always" when they drove or rode in an automobile. This rate exceeds the *Healthy People 2000* target of use of occupant protection systems by at least 85% of motor vehicle occupants. These high rates of seat belt use among military personnel, in

part, probably reflect regulations requiring personnel to use seat belts when they are driving or riding in motor vehicles on-base. However, as was noted in Chapter 1, comparison of civilian survey data on seat belt use with actual observation of people in motor vehicles suggests that there may be tendency for survey respondents to overreport their seat belt use. To the extent that military personnel do overreport their seat belt use, estimates of regular seat belt use may overestimate somewhat the percentages of personnel who actually use their seat belts regularly.

3.2.8 Helmet Use (Objective 9)

Table 3.3 also shows the percentages of motorcyclists and bicyclists who wore helmets "always" or "nearly always" when they rode a motorcycle or bicycle in the past 12 months. We based the estimates of helmet use by motorcyclists on those personnel who rode a motorcycle at least once in the past 12 months (unweighted N = 2,890). Similarly, we based the estimates of helmet use by bicyclists on those personnel who rode a bicycle at least once in the past 12 months (unweighted N = 8,937). Personnel who reported that they never rode a motorcycle in the past 12 months or who never rode a bicycle were excluded from these estimates.

Among personnel who rode a motorcycle at least once in the past 12 months, 71.0% wore helmets always or nearly always. This overall rate was somewhat below the *Healthy People 2000* objective of increasing helmet use to at least 80% of motorcyclists. Among personnel who rode bicycles in the past 12 months, 22.8% or slightly more than one in five used helmets always or nearly always. This rate was also considerably below the *Healthy People 2000* objective of helmet use by at least 50% of bicyclists. Taken together, these findings suggest that additional efforts will be needed to encourage regular helmet use by motorcyclists and bicyclists to reach the objectives of helmet use by the year 2000 among military personnel.

3.2.9 Condom Use (Objective 10)

The 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. Table 3.3 presents findings on condom use among sexually active unmarried personnel in the Military the last time they had intercourse. We defined "sexually active" personnel as those who had vaginal or anal intercourse in the 12 months prior to the survey. As shown, approximately 40% of unmarried personnel in the total DoD who were sexually active in the past 12 months used a condom. This rate was lower than the *Healthy People 2000* objective of 50% condom use at the last episode of sexual intercourse and suggests that the Military will need to focus additional attention in this area.

3.2.10 Pap Tests (Objective 11)

The major way that women can lessen the risk of cancer of the cervix is through regular Pap smear tests. As shown in Table 3.4, 97.1% of military women had ever received such tests, 95.2% had received the tests within the past 3 years. Military women, overall, exceeded the *Healthy People 2000* objectives of 95% having ever had a Pap smear and 85% having had one in the past 3 years. The near universality of receipt of Pap smears is notable. These exceptionally high rates of obtaining Pap smears probably reflect both ready access to care and mandatory care at specified intervals for military women.

3.2.11 Substance Use During Pregnancy (Objective 12)

Avoidance of substance use during pregnancy is important in ensuring maternal and infant health. As shown in Table 3.4, 85.2% of military women who had been pregnant in the past 5 years reported that they abstained from alcohol use during their last pregnancy. The *Healthy People 2000* objective states that the percentage of women using alcohol during pregnancy should be reduced by at least 20%. Thus, this information provides a baseline from which to measure change in future surveys. These data are encouraging in that the 1995 baseline shows that the large majority of women who were pregnant in the 5 years prior to the survey did not use alcohol during their last pregnancy. For this *Healthy People 2000* objective to be met, an increase of at least 20% would mean that the estimate of abstinence from alcohol during pregnancy would need to increase from 85.2% to 88.2%.

Table 3.4 also shows that 83.9% of military women who were pregnant during the past 5 years reported no cigarette use during their most recent pregnancy. This falls slightly below the *Healthy People 2000* objective of increasing abstinence from tobacco use during pregnancy to 90% or higher. Thus, greater preventive efforts need to be directed at those military women who used alcohol or smoked cigarettes during their last pregnancy.

3.2.12 Status in Meeting *Healthy People 2000* Objectives

The 12 objectives described in this section identified 16 targets to improve the health of military personnel. In addition, there is also a target about reduction of cigarette smoking among military personnel to 20%, bringing the total number of targets to 17. As noted earlier in this chapter, the percentage of current smokers in the Military is 31.9%, which substantially exceeds the objective of 20%. Of the 17 targets, 16 are specific and tangible in that they set a specific measurable goal for the population, and 1 (no alcohol use during pregnancy) that is more general and requires the development of a baseline for assessing future change. The 1995 DoD survey provides important data for

Table 3.4 Baseline Measures for *Healthy People 2000* Objectives for Military Women, Total DoD, 1995

Characteristic	Objective	Total DoD	
Pap Smear[a]			
Ever received	≥ 95%	97.1	(0.6)
Received in past 3 years	≥ 85%	95.2	(0.7)
Substance Use During Last Pregnancy[b]			
No alcohol use	Increase by at least 20%	85.2[c]	(1.3)
No cigarette use	≥ 90%	83.9	(1.4)

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

[a]Estimate made for women with an intact uterine cervix.

[b]Estimate made for women who were pregnant in the past 5 years. For women who were pregnant at the time of the survey, "last pregnancy" refers to the *current* pregnancy.

[c]Estimate provides a baseline rate against which to compare subsequent rates of abstinence from alcohol during pregnancy.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

establishing baseline reference points and for use in assessing progress toward these goals over the next several years as the Nation approaches the year 2000.

Overall, the present results show that the Military has already met or exceeded 5 of the 17 targets (overweight for personnel ages 20 and older, strenuous exercise, seat belt use, Pap smears ever received and Pap smears received in the past 3 years). Further, as discussed later in the report, other targets have been met by at least some demographic subgroups in the Military, even if not by the entire force. In addition, military personnel are 10% or less away from reaching the *Healthy People 2000* targets for another 4 of the 17 behaviors (overweight for personnel under age 20, helmet use for motorcyclists, condom use, no cigarette use during pregnancy).

Thus, the Military has made good progress in a number of areas, but faces considerable challenges in meeting the targets in all areas by the year 2000. It is noteworthy that the areas where targets have been met are those where military regulations help ensure compliance with the desired behaviors (weight control, exercise, seat belt use, Pap tests). It is not clear whether the targets for these behaviors would be achieved without such requirements. It seems clear that it will be more challenging to reach the targets in other areas where individuals have to take more initiative to achieve the targets of the objectives.

3.3 Summary

3.3.1 Unadjusted Trends in Substance Use

Comparisons of findings from six DoD surveys of military personnel conducted in 1980, 1982, 1985, 1988, 1992, and 1995 show a downward trend in the use of alcohol, illicit drugs, and cigarettes. Specifically, during the past 30 days for total DoD,

- heavy drinking declined significantly from 20.8% in 1980 to 17.1% in 1995;
- use of any illicit drugs declined sharply from 27.6% in 1980 to 3.0% in 1995; and
- cigarette smoking decreased significantly from 51.0% in 1980 to 31.9% in 1995.

In addition, the data showed a general shift toward lighter use of alcohol. The percentage of people who abstained from alcohol or who were infrequent/light drinkers increased from 25.6% in 1980 to 39.7% in 1995. Comparisons of findings between the 1992 and 1995 surveys show that only the rates of cigarette smoking declined significantly, whereas the rates of heavy drinking and illicit drug use did not. Nonetheless, smoking rates were considerably above the *Healthy People 2000* objective of a prevalence of no more than 20% among military personnel.

The finding of no significant decline from 1992 to 1995 in heavy drinking suggests that this is an area that may need greater emphasis by the Military. Indeed, the 1995 rate of heavy drinking had not changed significantly since 1988. The finding of no significant reduction in illicit drug use between 1992 and 1995 and the relatively low rates of use for both surveys suggests that illicit drug use may have reached its lower limit. It may be unrealistic to expect drug use rates to go much lower.

3.3.2 Trends in Substance Use Adjusted for Sociodemographic Differences

Members of the Armed Forces in 1995 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 all surveys since 1982 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 1995 (Table 3.2):

- Adjusted rates showed no significant decline in the rate of heavy drinking between 1980 and 1995. This contrasts with the significant decline observed for the same period for unadjusted rates. It suggests that if the demographic composition of the Military in 1995 had been like the composition in 1980, rates of heavy drinking between these two survey years would have been about the same.

- 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 1995. This indicates that the declines in use between surveys were not explained by shifts in the sociodemographic composition of the military population.

3.3.3 Alcohol-Related Negative Effects

Significant declines were found in the percentage of military personnel experiencing alcohol-related serious consequences, productivity loss, and symptoms of dependence (Figure 3.2; Table 3.1):

- serious consequences declined from 17.3% in 1980 to 7.6% in 1995;

- productivity loss declined significantly from 26.7% in 1980 to 16.3% in 1995; and

- symptoms of dependence decreased significantly from 8.0% in 1980 to 5.7% in 1995.

3.3.4 *Healthy People 2000* Baseline Measures

The 1995 DoD survey provided data for 13 *Healthy People 2000* objectives. These objectives identified 17 targets to improve the health of military personnel. These data establish baseline reference points for use in assessing progress toward these goals over the next several years as the Nation approaches the year 2000.

- Overall, the Military has already met or exceeded 5 of the 17 targets (overweight for personnel aged 20 or older, strenuous exercise, seat belt use, Pap smears ever received and Pap smears received in the past 3 years).

- Other targets have been met by at least some demographic subgroups in the Military, even if not by the entire force.

- Military personnel are 10 percentage points or less away from reaching the *Healthy People 2000* targets for another 4 of the 17 behaviors (overweight for personnel under age 20, helmet use for motorcyclists, condom use, no cigarette use during pregnancy).

Thus, the Military has made good progress in a number of areas, but faces considerable challenges in meeting the targets in all areas by the year 2000. It is noteworthy that the areas where targets have been met are those where military

regulations help ensure compliance with the desired behaviors (weight control, exercise, seat belt use, Pap tests). It is not clear whether the targets for these behaviors would have been achieved without such requirements. It seems clear that it will be more challenging to reach the targets in other areas where change is more dependent on the initiative of individuals.

3.3.5 Areas of Challenge

Overall, these findings indicate that the Military has made steady and notable progress during the past 15 years in combating illicit drug use and smoking and in reducing alcohol-related problems. The 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 (DoD, 1980a, 1980b, 1985a, 1985b) and cessation of smoking that began during the mid-1980s (DoD, 1986b, 1994).

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 slightly more than one in six 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 1995 rate had not changed significantly from the 1980 rate. This finding suggests that the observed declines in heavy drinking from 1980 to 1995 (unadjusted rates) were largely a function of changes in the demographic composition of the Military and that additional efforts will be needed to reduce heavy drinking.

The Military has also made progress in a number of areas toward meeting selected *Healthy People 2000* objectives, but primarily in areas that are mandated by military regulations. They will need to expend considerable effort to meet the objectives in all areas by the year 2000. Findings suggest that the largest gaps and greatest challenges will be to meet the objectives for smoking, smokeless tobacco, blood pressure checks, controlling high blood pressure, reducing hospitalization rates, and increasing helmet use by bicyclists.

4. ALCOHOL USE

This chapter presents detailed analyses of alcohol use among military personnel; we examine trends in alcohol use, Service comparisons, correlates of alcohol use, negative effects of alcohol use, participation in counseling and treatment for alcohol problems, 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 heavy alcohol use. Negative effects of alcohol use include serious consequences, productivity loss, and dependence symptoms. We have included in Appendix D additional information on sociodemographic characteristics associated with alcohol use (Tables D1 to D5).

4.1 Trends in Alcohol Use

In this section, we provide two sets of estimates of alcohol use for the survey years from 1980 to 1995: the average daily ounces of alcohol (ethanol) and heavy alcohol use in the past 30 days. For each measure, we provide both observed (unadjusted) estimates and adjusted estimates; the latter take into account changes in sociodemographic characteristics over the course of the surveys.

4.1.1 Average Daily Ounces of Alcohol

As shown in the unadjusted portions of Table 4.1, the average amount of ethanol consumed per day has decreased substantially since 1980 for all DoD personnel and for personnel from the individual Services. For the total DoD, the amount decreased from 1.48 ounces per day in 1980 to 0.83 ounce in 1995. This represents a 44% decrease over the 15-year period. The decreases from 1985 to 1988 and from 1988 to 1992 were statistically significant. Between 1992 and 1995, the average amount of ethanol consumed per day increased slightly, from 0.81 ounce per day in 1992 to 0.83 ounce per day in 1995. This increase was present for personnel from the individual Services, with the exception of the Air Force, which decreased from 0.57 ounce in 1992 to 0.53 ounce in 1995. None of these latter changes, however, is statistically significant.

Over the 15-year period, alcohol consumption among members of each of the individual Services also decreased substantially (see the unadjusted portions of Table 4.1). We observed significant decreases of 43% for Army personnel, 45% for Navy personnel, 37% for Marine Corps personnel, and 51% for Air Force personnel. Consumption among Air Force personnel was by far the lowest of all the Services in each of the survey years and showed the greatest decrease.

The observed decreases in alcohol consumption may partially reflect changes in the sociodemographic composition of the military population over time. Between 1980 and 1995, the military population became slightly older and more likely to be married, factors

Table 4.1 Trends in Average Daily Ounces of Ethanol Consumed, Past 30 Days, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1995

Service/Type of Estimate	Year of Survey					
	1980	1982	1985	1988	1992	1995
Army						
Unadjusted	1.61 (0.10)	1.58 (0.08)	1.38 (0.12)	1.14 (0.06)	0.89 (0.06)[a]	0.92 (0.07)[c]
Adjusted[b]	1.61 (0.10)	1.51 (0.06)	1.46 (0.11)	1.21 (0.04)[a]	1.09 (0.05)	1.04 (0.06)[c]
Navy						
Unadjusted	1.64 (0.12)	1.64 (0.12)	1.33 (0.10)	0.92 (0.06)[a]	0.86 (0.10)	0.91 (0.08)[c]
Adjusted[b]	1.64 (0.12)	1.58 (0.09)	1.42 (0.08)	1.02 (0.06)[a]	0.94 (0.10)	1.07 (0.08)[c]
Marine Corps						
Unadjusted	1.75 (0.09)	1.45 (0.09)[a]	1.47 (0.22)	1.25 (0.13)	1.08 (0.06)	1.11 (0.07)[c]
Adjusted[b]	1.75 (0.09)	1.47 (0.02)[a]	1.54 (0.15)	1.51 (0.19)	1.08 (0.05)[a]	1.29 (0.07)[a,c]
Air Force						
Unadjusted	1.08 (0.11)	0.96 (0.05)	0.86 (0.07)	0.72 (0.03)	0.57 (0.03)[a]	0.53 (0.04)[c]
Adjusted[b]	1.08 (0.11)	0.97 (0.04)	0.85 (0.06)	0.75 (0.03)	0.64 (0.03)[a]	0.57 (0.05)[c]
Total DoD						
Unadjusted	1.48 (0.07)	1.41 (0.05)	1.22 (0.06)	0.96 (0.03)[a]	0.81 (0.04)[a]	0.83 (0.04)[c]
Adjusted[b]	1.48 (0.07)	1.38 (0.03)	1.29 (0.05)	1.06 (0.03)[a]	0.92 (0.03)[a]	0.94 (0.04)[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. Definitions and measures of substance use are given in Section 2.5.3.

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

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

both related to lower levels of alcohol use (Bray et al., 1995). 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 1995 surveys to take into account demographic changes since 1980. We standardized the demographic distributions of the military population from the 1982 to 1995 surveys to the 1980 age, education, and marital status distribution for each Service and the total DoD. These results are presented as adjusted estimates in Table 4.1. (See Appendix F for a technical discussion of standardization procedures.) These adjusted estimates are *constructed* estimates and are not the actual, observed prevalence estimates for these survey years.

For the total DoD, adjustment of estimates of average daily alcohol (ethanol) consumption across the DoD survey series increased the estimate in 1995 from 0.83 to 0.94 ounce. 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 1995) 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.

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 1995. These findings suggest that the overall decreases in average alcohol consumption for the Services since the survey series began in 1980 were not due primarily to sociodemographic changes. However, the adjusted estimate between 1992 and 1995 for the Marine Corps was influenced by sociodemographic changes. That is, after the adjustment, Marines showed a significantly higher consumption of ethanol in 1995 than in 1992.

4.1.2 Heavy Alcohol Use

As shown in the unadjusted portions of Table 4.2, heavy drinking decreased from 1980 to 1995 for the total DoD and for each of the Services (see also Table 3.1 in Chapter 3 for drinking levels). The percentage of heavy drinkers among total DoD personnel decreased significantly about 4 percentage points between 1980 and 1995, an 18% decrease from 20.8% in 1980 to 17.1% in 1995. We also found statistically significant decreases over the 15-year period for the Navy (a 27% decrease) and the Air Force (a 28% decrease), but not for the Army or Marine Corps.

For the total DoD and each of the Services, heavy alcohol use was relatively stable between the 1980 and 1985 surveys, and the decreases occurred during the latter part of the period, after 1985. In 1995, the percentage of heavy drinkers from lowest to highest was 10.3% among Air Force personnel, 18.0% among Army personnel, 18.8% among Navy personnel, and 27.8% among Marine Corps personnel. The percentage of heavy drinkers

Table 4.2 Trends in Heavy Alcohol Use, Past 30 Days, Unadjusted and Adjusted for Sociodemographic Differences, 1980-1995

Service/ Type of Estimate	Year of Survey					
	1980	1982	1985	1988	1992	1995
Army						
Unadjusted	20.3 (1.6)	24.7 (1.4)[a]	25.2 (2.2)	19.5 (1.1)[a]	17.2 (1.5)	18.0 (1.8)
Adjusted[b]	20.3 (1.6)	23.5 (1.3)	25.8 (1.6)	21.8 (0.8)[a]	23.5 (1.5)	20.7 (1.8)
Navy						
Unadjusted	25.6 (2.3)	27.7 (2.9)	24.9 (1.4)	14.6 (2.1)[a]	13.8 (1.4)	18.8 (1.4)[a,c]
Adjusted[b]	25.6 (2.3)	26.7 (2.4)	26.6 (1.6)	16.1 (2.8)[a]	15.7 (2.7)	23.6 (1.5)[a]
Marine Corps						
Unadjusted	28.6 (2.5)	30.6 (0.9)	29.4 (3.7)	23.9 (3.9)	25.5 (1.2)	27.8 (2.4)
Adjusted[b]	28.6 (2.5)	31.6 (2.4)	30.8 (2.0)	29.7 (2.7)	29.3 (2.8)	32.7 (1.9)
Air Force						
Unadjusted	14.3 (1.4)	17.7 (1.2)	16.4 (1.4)	14.5 (1.0)	10.7 (0.8)[a]	10.3 (1.1)[c]
Adjusted[b]	14.3 (1.4)	18.1 (0.8)[a]	16.9 (1.2)	15.8 (0.8)	12.5 (0.7)[a]	11.9 (0.9)
Total DoD						
Unadjusted	20.8 (1.1)	24.1 (1.0)[a]	22.9 (1.1)	17.0 (0.9)[a]	15.2 (0.7)	17.1 (0.8)[c]
Adjusted[b]	20.8 (1.1)	23.6 (0.9)[a]	24.0 (0.8)	19.3 (0.9)[a]	18.9 (0.9)	20.1 (0.8)

Note: Estimates are expressed as percentages (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. Definitions and measures of substance use are given in Section 2.5.3.

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

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

was lowest among Air Force personnel in each of the survey years, reaching its lowest level in 1995. Between 1992 and 1995, the percentage of heavy drinkers was relatively stable for the individual Services except for the Navy, which showed a statistically significant increase in the percentage of heavy drinkers, from 13.8% in 1992 to 18.8% in 1995. The 1995 estimates of heavy drinkers for Army and Marine Corps personnel represent slight, but not statistically significant, increases since 1992.

In general, adjustments for sociodemographic differences for the total DoD and each of the Services increased the estimates of heavy drinking by about one to four percentage points. The adjustments by standardization did alter the unadjusted patterns of significant differences between the surveys from 1980 to 1995. For adjusted rates, there was no significant decline in the rate of heavy drinking between 1980 and 1995 for the total DoD or each of the Services. The 1995 adjusted rates were nearly identical to those in 1980 for the total DoD and the Army. Both the Navy and the Air Force showed slightly lower rates of heavy drinking in 1995, while the adjusted rate of heavy drinking in the Marine Corps was higher in 1995 than in 1980. However, none of these differences in the adjusted rates between 1980 and 1995 was significantly different.

To summarize, the overall amount of alcohol consumption decreased significantly between 1980 and 1995 for the total DoD and for personnel from the individual Services. Decreases in the percentages of heavy drinkers occurred mainly since 1985. Taken together, these findings suggest that the Military made some gains in reducing alcohol use and heavy alcohol use among its personnel, but that much more work is still needed. However, adjusted estimates suggest that reductions in heavy drinking between 1980 and 1995 both for the total DoD for and each of the Services appear to have been largely a reflection of changes in the sociodemographic composition of the Military rather than a result of programmatic efforts to reduce heavy drinking. These findings indicate that further effort will be needed to reduce heavy drinking in the Military.

Beginning with the 1985 survey, the question on the typical size of the beer container that respondents usually drank included a response category for liter or quart (32-ounce) bottles or mugs. For consistency with prevalence estimates in 1980 and 1982, which did not include this response category, the 1985 through 1995 estimates shown above did not take into account respondents who said that they typically drank beer in this size container. However, this size beverage container could be important for some subgroups in the Military, such as personnel stationed in Europe, where beer is commonly served in liter mugs.

Appendix G compares estimates of drinking levels and average ounces of ethanol consumption from 1985 through 1995 based on two different estimation procedures that did or did not take into account typical consumption of beer in 32-ounce containers. In general, including the 32-ounce response category changed the estimates only slightly (if

at all) relative to estimates that excluded this response category. More important, the general conclusions about trends in drinking levels and average ethanol consumption would be basically unchanged. If the 32-ounce response category for beer had any effect, the net result for estimates of drinking levels was to (a) decrease slightly the estimates for abstainers, infrequent/light drinkers, and moderate drinkers, and (b) increase slightly the estimates for moderate/heavy and heavy drinkers. Similarly, inclusion of the 32-ounce category for beer tended to raise some estimates of average ethanol consumption very slightly.

4.2 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 1995 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 2.6, 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 direct standardization procedures to control for sociodemographic differences (see Appendix F). These constructed estimates resulting from standardization permit comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 1995. Unadjusted and adjusted estimates for both ounces of ethanol and heavy alcohol use are shown in Table 4.3.

4.2.1 Unadjusted Estimates

Comparisons of unadjusted estimates of average daily alcohol (ethanol) consumption (Table 4.1) and heavy drinking (Table 4.2) show that alcohol use has generally been lower among Air Force personnel than for personnel from the other Services. In 1995, 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. There were no statistically significant differences between the Army, Navy, or the 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 1995 were significantly lower among Air Force personnel than among personnel in the other Services. In addition, the rate of heavy drinking for the Marine Corps was significantly higher than for Army and Navy personnel.

Table 4.3 Estimates of Alcohol Use, Unadjusted and Adjusted for Sociodemographic Differences, by Service, 1995

Measure/ Type of Estimate	Service			
	Army	Navy	Marine Corps	Air Force
Average Daily Ounces of Ethanol				
Unadjusted	0.92 (0.07)[a]	0.91 (0.08)[a]	1.11 (0.07)[a]	0.53 (0.04)
Adjusted[b]	0.91 (0.04)[a]	0.88 (0.06)[a]	0.86 (0.03)[a]	0.60 (0.04)
Heavy Alcohol Use				
Unadjusted	18.0 (1.8)[a,c]	18.8 (1.4)[a,c]	27.8 (2.4)[a]	10.3 (1.1)
Adjusted[b]	18.0 (1.3)[a,c]	18.4 (1.1)[a,c]	21.2 (0.8)[a]	11.9 (1.0)[c]

Note: Entries for average daily ounces of ethanol are mean values, and entries for 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). Differences that were statistically significant are indicated. Definitions and measures of substance use are given in Section 2.5.3.

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

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

[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: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

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 (27.8%) being heavy drinkers. The Air Force faces the smallest challenge, with 10.3% of Air Force personnel being heavy drinkers. Rates for the Army (18.0%) and Navy (18.8%) 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.

4.2.2 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 who have been shown in previous DoD

surveys to be more likely to be heavy drinkers (Bray et al., 1995). Conversely, the lower levels of alcohol consumption and heavy drinking in the Air Force may have been due in part to its demographic composition, 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 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 1995. 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 (see Appendix F). These adjusted estimates following standardization are presented in Table 4.3 for both daily alcohol use and heavy alcohol use.

For average daily alcohol (ethanol) consumption, adjusting the estimates for sociodemographic differences lowered the Army estimate from an average of 0.92 ounce of ethanol per day to an average of 0.91 ounce. Standardization raised the Air Force estimate from an average of 0.53 ounce of ethanol per day to an average of 0.60 ounce. Standardization lowered the Navy estimate from 0.91 ounce per day (unadjusted) to 0.88 ounce (adjusted). Standardization had the greatest effect on the Marine Corps estimate, resulting in a decrease from 1.11 ounces per day on average (unadjusted) to 0.86 ounce (adjusted). This finding suggests that the higher alcohol consumption among Marine Corps personnel was partially associated with sociodemographic composition.

Following standardization, however, the Air Force continued to have a significantly lower level of average alcohol consumption compared to the other Services. These results suggest that the lower level of average daily alcohol consumption in the Air Force was not due to differences in sociodemographic composition.

With regard to heavy alcohol use, standardization to the total DoD demographic composition raised the prevalence estimates slightly for the Air Force (from 10.3% to 11.9%) and slightly lowered the Navy estimates (from 18.8% to 18.4%). Adjusting the estimates for sociodemographic differences had no effect for the Army estimates. 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 six percentage points, from 27.8% (unadjusted) to 21.2% (adjusted). Following standardization, the Air Force continued to have a significantly lower rate of heavy drinking than did the other Services, and the Marine Corps continued to have a significantly higher rate of heavy drinking compared to the other Services.

These results indicate that differences in the rates of heavy drinking in 1995 between the Services were not explained by differences in the sociodemographic composition of these Services. That is, the varying rates were due to other factors among personnel (e.g., attitudes, values) or differences in programs and practices among these Services. This finding is particularly important for the Marine Corps, which has consistently shown the highest unadjusted rates of heavy drinking across the DoD survey series. The distinctive sociodemographic makeup of the Marine Corps, however, which has a higher representation of personnel at greater risk for heavy drinking, is an important factor in the rate of heavy drinking. 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.

4.3 Correlates of Heavy Alcohol Use

Past research on military and civilian populations has firmly established that alcohol use patterns differ among certain sociodemographic groups and social conditions (Bray et al., 1992; Clark & Hilton, 1991; Midanik & Clark, 1994). For example, drinking tends to be more common and heavier among younger persons, males, and the less well educated. 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 alcohol use. Two types of analyses were conducted: descriptive prevalence analyses and multivariate logistic regression analyses. Results of both are presented in Table 4.4, with column 2 presenting prevalence data for the demographic groups and column 3 showing the odds ratios from the logistic regression.

The prevalence data indicate significant differences for Service, sex, race/ethnicity, education, age, family status, and pay grade. As discussed previously, Army, Navy, and Marine Corps personnel were more likely to be heavy drinkers than were Air Force personnel. Others more likely to drink heavily were males, nonblacks, those with less education, those who were younger, those who were not married or were married but unaccompanied by their spouse, and those in pay grades E1 to E6.

For the logistic regression model, we used the probability of being a heavy drinker as the dependent measure. The dichotomous outcome measure was heavy drinking versus other drinking levels (excluding abstainers). The independent variables included eight sociodemographic variables: Service, sex, race/ethnicity, education, age, family status, pay grade, and region. As shown in Table 4.4, all of the demographic variables, with the exception of region, were significant predictors of heavy drinking. Results show that the odds of being heavy drinkers were significantly higher, after we adjusted for all other variables in the analysis, for the following:

Table 4.4 Demographic Correlates of Heavy Alcohol Use, Past 30 Days, Total DoD

Sociodemographic Characteristic	Prevalence	Adjusted Odds Ratio[a]	95% CI of Odds Ratio[b]
Service			
Army	18.0 (1.8)	1.62	(1.23,2.15)
Navy	18.8 (1.4)	1.71	(1.31,2.22)
Marine Corps	27.8 (2.4)	2.01	(1.57,2.58)
Air Force	10.3 (1.1)	1.00	NA
Sex			
Male	18.8 (0.9)	4.17	(3.22,5.41)
Female	5.3 (0.8)	1.00	NA
Race/Ethnicity			
White, non-Hispanic	18.4 (1.0)	1.00	NA
Black, non-Hispanic	11.9 (1.0)	0.52	(0.41,0.65)
Hispanic	19.3 (1.6)	0.82	(0.66,1.01)
Other	15.0 (2.0)	0.70	(0.51,0.95)
Education			
High school or less	25.2 (1.3)	2.10	(1.45,3.05)
Some college	15.7 (0.7)	1.66	(1.20,2.29)
College graduate or higher	5.2 (0.6)	1.00	NA
Age			
20 or younger	27.9 (1.7)	1.39	(1.06,1.80)
21-25	24.8 (1.1)	1.86	(1.44,2.39)
26-34	13.0 (0.9)	1.42	(1.12,1.81)
35 or older	6.9 (0.6)	1.00	NA
Family Status			
Not married	26.3 (1.2)	2.28	(1.95,2.66)
Married, spouse not present	19.2 (2.1)	1.80	(1.33,2.42)
Married, spouse present	10.3 (0.6)	1.00	NA
Pay Grade			
E1-E3	29.3 (1.3)	5.03	(2.85,8.88)
E4-E6	17.4 (1.0)	3.78	(2.21,6.47)
E7-E9	9.2 (0.6)	3.33	(2.03,5.46)
W1-W5	7.3 (1.1)	2.02	(1.12,3.66)
O1-O3	6.0 (0.8)	2.10	(1.29,3.45)
O4-O10	1.8 (0.4)	1.00	NA
Region			
CONUS[c]	16.7 (1.0)	0.84	(0.69,1.01)
OCONUS[d]	19.1 (1.7)	1.00	NA
Total	17.1 (0.8)	NA	NA

Note: Prevalence estimates are percentages (with standard errors in parentheses). Definitions and measures of substance use are given in Section 2.5.3.

NA = Not applicable.

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

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

[c]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[d]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

- Army, Navy, and Marine Corps than Air Force personnel;
- males than females;
- whites than other racial/ethnic groupings, except Hispanics;
- those with a high school education or less and those with some college than those with more education;
- those younger than age 35 than those aged 35 or older;
- those who were single or married with spouse absent than those who were married with spouse present; and
- those in pay grades E1 to E3 through O1 to O3 than those in pay grades O4 to O10.

Pay grade and sex showed the strongest effects in the model. Junior personnel in pay grades E1 to E3 were five times more likely than senior officers in pay grades O4 to O10 to be heavy drinkers, and personnel in pay grades E4 to E9 were over three times more likely. Other pay grades, including W1 to W5 and O1 to O3, were twice as likely than senior officers to be heavy drinkers. Male personnel were four times more likely than female personnel to be heavy drinkers. The logistic model also showed that single personnel and personnel with a high school education or less were twice as likely to be heavy drinkers than married personnel with spouse present and college graduates, respectively. These logistic regression analyses suggest that prevention efforts for heavy alcohol use might best focus on lower grade enlisted male personnel in the Army, Navy, and Marine Corps, as well as on single personnel and personnel with a high school education or less.

4.4 Negative Effects of Alcohol Use

In this section, we examine the negative effects of alcohol consumption on military personnel. First, we examine trends in negative effects and contrast findings from the 1980 to the 1995 DoD surveys. Next, we examine (a) negative effects as a function of pay grade and (b) the role of drinking levels on serious consequences.

4.4.1 Trends in Negative Effects

The Military has shown dramatic reductions in alcohol-related negative effects during the 15-year period from 1980 to 1995. Alcohol-related negative effects have declined significantly since 1980. In 1995, 7.6% of military personnel reported having experienced a serious consequence associated with alcohol use during the past year, 16.3% reported some productivity loss, and 5.7% reported one or more symptoms of dependence (see Table 3.1 in Chapter 3). These percentages were essentially the same as those in the 1992 survey (i.e., 7.6%, 16.4%, and 5.2%, respectively). Our definition of dependence, as described in Section 2.5.3, does not reflect the strict definition used in the *Diagnostic and*

Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association [APA], 1987). Rather, it only includes one or more symptoms commonly associated with dependence. Between 1980 and 1995, the decreases in serious consequences and productivity loss were statistically significant.

The same reductions in negative effects that we observed for total DoD also occurred for personnel in each of the Services. Figure 4.1 shows Service trends from 1980 to 1995 for each of the three types of negative effects due to alcohol use. We found a steady decline in serious consequences among Army personnel from 17.9% in 1980 to 7.9% in 1995. Following an increase in productivity loss between 1980 to 1982, productivity loss for Army personnel returned to 1980 levels in 1985 and declined further to 16.5% in 1995. Trends in symptoms of alcohol dependence showed 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, dropped further to 5.4% in 1992, and increased slightly to 6.4% in 1995.

We found a steady decline in serious consequences among Navy personnel from 22.1% in 1980 to 8.6% in 1995. Following an increase in productivity loss between 1980 to 1982, productivity loss for the Navy returned to 1980 levels in 1985 and declined steadily to 20.1% in 1995. Trends in symptoms of alcohol dependence showed a somewhat different pattern than serious consequences or productivity loss. For the Navy, alcohol dependence symptoms increased from 9.7% in 1980 to 11.6% in 1982, dropped significantly in 1985, and remained fairly constant until ending at 6.1% in 1995.

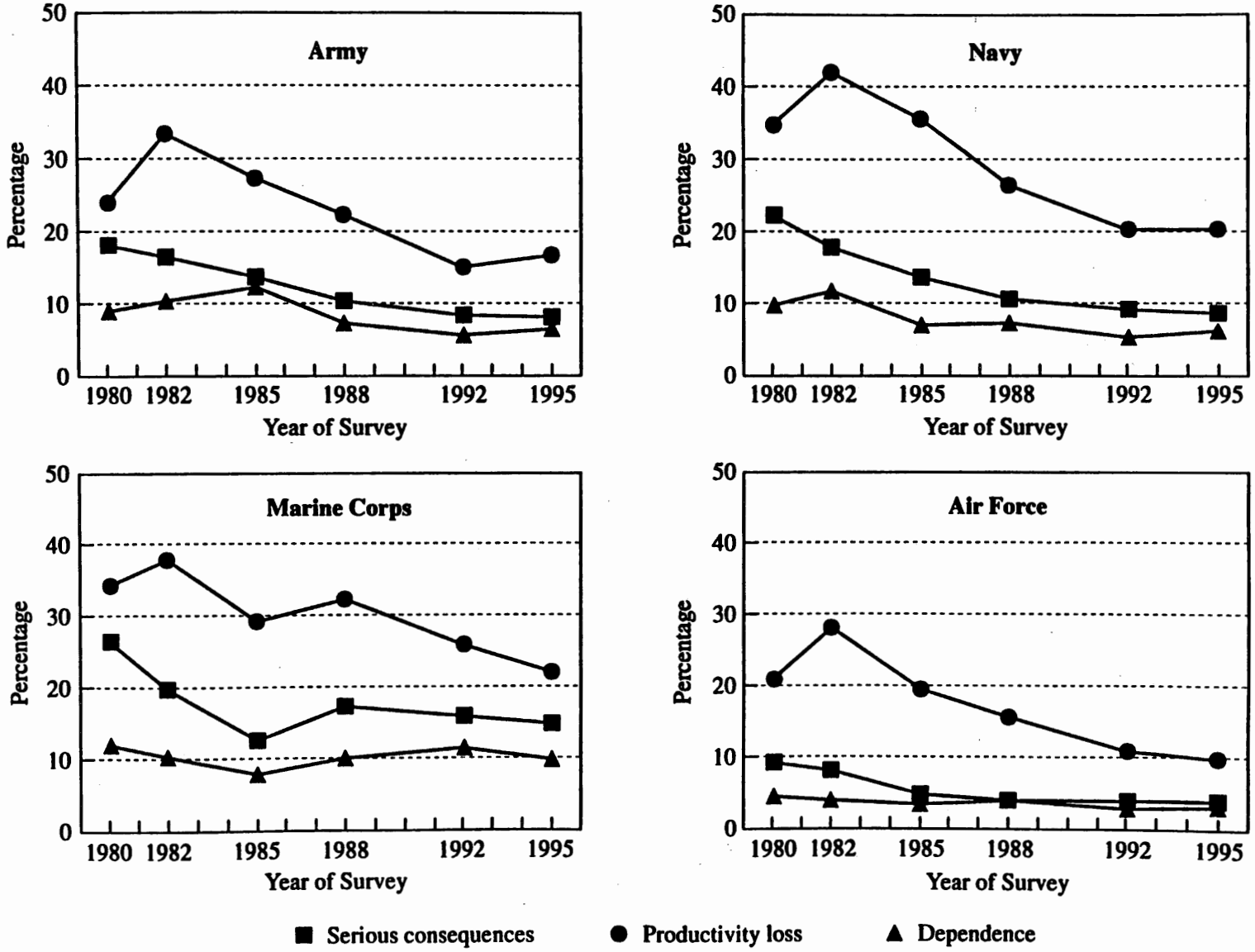
Serious consequences among Marine Corps personnel declined from 26.2% in 1980 to 14.7% in 1995. Following an increase in productivity loss between 1980 and 1982, productivity loss for the Marine Corps decreased to 28.9% in 1985, increased in 1988 to 31.0%, and declined to 21.8% by 1995. Trends in symptoms of alcohol dependence showed a somewhat different pattern than serious consequences or productivity loss. Following a decrease in dependence symptoms between 1980 and 1985, dependence symptoms returned to the 1980 levels and then decreased to 9.6% in 1992.

We found a steady decline in serious consequences among Air Force personnel from 9.0% in 1980 to 3.7% in 1995. Following an increase in productivity loss between 1980 to 1982, productivity loss for the Air Force returned to 1980 levels in 1985 and declined steadily to 9.9% in 1995. The Air Force showed the fewest dependence symptoms throughout the 15-year period, from 4.3% in 1980 down to 3.0% in 1995.

4.4.2 Pay Grade Differences

As discussed earlier, because those in the lower pay grades are more likely to drink heavily, a similar distribution might be expected for negative effects of alcohol use. As Table 4.5 indicates, there were considerable variations in the problems reported

Figure 4.1 Trends in Alcohol-Related Negative Effects, by Service, 1980-1995



Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980-1995.

Table 4.5 Negative Effects of Alcohol Use, Past 12 Months, by Pay Grade

Measure/Pay Grade	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Serious Consequences					
E1-E3	16.7 (1.1)	19.8 (2.4)	24.0 (1.9)	7.6 (1.1)	16.9 (1.0)
E4-E6	7.5 (1.3)	7.2 (0.6)	11.9 (1.2)	3.9 (0.7)	6.8 (0.5)
E7-E9	2.5 (0.5)	2.6 (0.6)	3.2 (0.3)	1.0 (0.3)	2.1 (0.2)
W1-W5	0.7 (0.7)	1.5 (1.0)	0.9 (0.6)	NA NA	0.8 (0.5)
O1-O3	2.5 (0.7)	1.5 (0.5)	4.6 (1.4)	1.6 (0.9)	2.1 (0.4)
O4-O10	0.3 (0.3)	0.7 (0.4)	0.7 (0.4)	0.7 (0.3)	0.5 (0.2)
Productivity Loss					
E1-E3	23.2 (2.6)	29.4 (3.0)	31.6 (1.8)	13.6 (1.3)	24.5 (1.3)
E4-E6	19.0 (1.8)	20.7 (2.3)	19.0 (1.7)	10.8 (0.8)	17.2 (1.0)
E7-E9	6.2 (0.5)	9.3 (1.1)	7.5 (0.8)	6.5 (0.7)	7.2 (0.4)
W1-W5	5.4 (2.0)	7.9 (2.3)	8.5 (1.8)	NA NA	6.2 (1.5)
O1-O3	9.8 (1.6)	13.5 (1.3)	14.3 (1.1)	7.9 (1.4)	10.3 (0.8)
O4-O10	3.8 (0.7)	6.2 (1.4)	4.8 (1.8)	3.4 (0.5)	4.3 (0.5)
Dependence Symptoms					
E1-E3	12.8 (2.1)	12.6 (1.8)	16.3 (1.1)	5.4 (1.1)	11.8 (0.9)
E4-E6	6.7 (0.8)	5.7 (0.7)	7.3 (1.1)	3.6 (0.6)	5.6 (0.4)
E7-E9	1.7 (0.5)	1.8 (0.4)	1.2 (0.3)	1.6 (0.5)	1.6 (0.2)
W1-W5	0.5 (0.5)	0.8 (0.7)	1.2 (0.8)	NA NA	0.6 (0.4)
O1-O3	0.8 (0.5)	0.6 (0.3)	3.3 (1.1)	+ (+)	0.6 (0.2)
O4-O10	0.5 (0.3)	0.1 (0.1)	0.7 (0.4)	0.7 (0.3)	0.5 (0.2)

Note: Table values are percentages of all personnel (with standard errors in parentheses). Definitions of negative effects measures are given in Section 2.5.3.

NA = Not applicable.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

by individuals in different pay grades. The highest levels of serious consequences, productivity loss, and dependence symptoms consistently occurred in the lowest pay grades (i.e., E1 to E3). Productivity loss was also high in pay grades E4 to E6. Rates of alcohol use's negative effects for serious consequences, productivity loss, and dependence symptoms were lowest in pay grades O4 to O10. For the total DoD, 16.9% of junior enlisted personnel (E1s to E3s) but only 0.5% of senior officers (O4s to O10s) reported the occurrence of serious consequences due to alcohol consumption. For productivity loss, 24.5% of E1s to E3s reported a problem compared with 4.3% of O4s to O10s. The level of dependence symptoms was 11.8% for E1s to E3s and 0.5% for O4s to O10s. The pattern we observed for the total DoD occurred for all of the Services.

In view of the high rates of problems among E1s to E3s, Table 4.5 includes Service comparisons. Serious consequences among E1s to E3s were highest in the Marine Corps (24.0%), followed by the Navy (19.8%), the Army (16.7%), and the Air Force (7.6%). Serious consequences among E4s to E6s were also found to be highest in the Marine Corps (11.9%). Productivity loss among E1s to E3s was highest in the Marine Corps (31.6%) and Navy (29.4%), followed by the Army (23.2%) and the Air Force (13.6%). Productivity loss was equally high among E4s to E6s in the Marine Corps (19.0%), Navy (20.7%), and Army (19.0%). We also found productivity loss to be high among O1s to O3s in the Marine Corps (14.3%) and Navy (13.5%). Finally, from 12% to 16% of E1s to E3s in the Army, Navy, and Marine Corps experienced dependence symptoms, along with 5% 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.

4.4.3 Drinking Levels and Serious Consequences

To better understand the influence of drinking levels on serious consequences, we examined the relationship between drinking levels (omitting abstainers) and the percentage of personnel with one or more alcohol-related serious consequences (see Table 4.6). Approximately a quarter of heavy drinkers had one or more serious consequences (23.8%), a rate that was more than three times as great as for any other group of drinkers. We observed the next highest prevalence among those who were moderate/heavy drinkers, with 7.8% experiencing at least one serious consequence. The lowest rate occurred among moderate drinkers (3.7%) rather than among the infrequent/light drinkers (4.3%). 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 sporadic drinkers or "binge" drinkers who, although they did not drink frequently, encountered problems when they did.

Table 4.6 Serious Consequences of Alcohol Use, by Drinking Level

Drinking Level	Serious Consequence
Infrequent/light	4.3 (0.5)
Moderate	3.7 (0.5)
Moderate/heavy	7.8 (0.9)[a,c]
Heavy	23.8 (1.3)[a,b,c]

Note: Entries are percentages of personnel with one or more alcohol-related serious consequences. Standard errors are in parentheses. Definitions and measures of drinking levels are given in Appendix E.

[a]Significantly higher than for moderate drinkers.

[b]Significantly higher than for moderate/heavy drinkers.

[c]Significantly higher than for infrequent/light drinkers.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

4.5 Participation in Counseling and Treatment Programs

As Table 4.7 indicates, few military personnel reported actually receiving treatment for an alcohol problem since joining the Military. Only 8.7% of all active-duty personnel reported having received treatment for an alcohol problem. Although fewer Air Force personnel reported having been treated for an alcohol problem, their lower treatment rates are likely closely tied to lower alcohol use levels. When compared to the Air Force treatment rate of 7.0%, however, the treatment rates for the other Services (7.6% for the Army, 11.3% for the Navy, and 9.3% for the Marine Corps) do not appear to be relatively higher than the Air Force's rate, given the significantly higher levels of alcohol use among personnel from these other Services. For all Services, alcohol treatment was more likely to be provided through a military treatment program than through military medical facilities or through civilian medical facilities or treatment programs.

As shown in Table 4.7, there was little difference in participation in alcohol counseling and treatment programs between the total DoD sample and those who were alcohol users in the past 30 days. This most likely reflects the fact that approximately 80% of all active-duty personnel were drinkers. Rates of alcohol counseling and treatment program participation were higher among heavy alcohol users (14.3%) when compared to the total DoD personnel (8.7%) or any alcohol users (9.0%). In contrast to the variations in heavy alcohol use by type of Service, there was less variation in participation in counseling and treatment programs among heavy alcohol users by branch of Service (14.1% for Army, 15.6% for Navy, 13.2% for Marine Corps, and 13.4% for Air Force).

Table 4.7 Participation in Alcohol Counseling and Treatment Programs Since Joining the Military

Group/Program	Service: Army	Navy	Marine Corps	Air Force	Total DoD
All Personnel					
Through military medical facility	2.5 (0.3)	4.7 (0.5)	3.6 (0.5)	3.5 (0.5)	3.5 (0.2)
Through military treatment program	6.1 (0.6)	9.4 (0.8)	7.7 (0.4)	5.8 (0.7)	7.2 (0.4)
Through civilian medical facility	0.5 (0.2)	0.9 (0.2)	0.5 (0.1)	0.2 (0.1)	0.5 (0.1)
Through civilian treatment program	1.3 (0.3)	2.1 (0.4)	1.9 (0.3)	1.3 (0.2)	1.6 (0.2)
Any counseling or treatment	7.6 (0.7)	11.3 (0.9)	9.3 (0.4)	7.0 (0.8)	8.7 (0.4)
Alcohol Users, Past 30 Days					
Through military medical facility	2.6 (0.3)	3.7 (0.4)	3.5 (0.6)	3.6 (0.6)	3.3 (0.2)
Through military treatment program	7.1 (0.8)	8.6 (0.8)	7.9 (0.5)	6.2 (1.0)	7.4 (0.4)
Through civilian medical facility	0.3 (0.1)	0.6 (0.1)	0.3 (0.2)	0.2 (0.1)	0.4 (0.1)
Through civilian treatment program	1.3 (0.3)	1.7 (0.3)	1.9 (0.4)	1.4 (0.3)	1.5 (0.2)
Any counseling or treatment	8.6 (0.8)	10.6 (0.9)	9.7 (0.5)	7.4 (1.1)	9.0 (0.5)
Heavy Alcohol Users, Past 30 Days					
Through military medical facility	3.4 (0.6)	6.0 (0.7)	5.1 (0.9)	5.4 (1.0)	4.9 (0.4)
Through military treatment program	11.3 (2.0)	11.4 (1.2)	10.9 (0.9)	11.2 (1.6)	11.2 (0.8)
Through civilian medical facility	0.8 (0.6)	1.3 (0.6)	0.8 (0.4)	0.4 (0.2)	0.9 (0.3)
Through civilian treatment program	2.1 (1.1)	3.0 (1.3)	2.1 (0.6)	2.4 (0.9)	2.5 (0.6)
Any counseling or treatment	14.1 (2.1)	15.6 (1.4)	13.2 (0.9)	13.4 (1.9)	14.3 (0.9)

Note: Entries are percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

However, this finding that a substantial proportion of *current* heavy alcohol users (i.e., heavy alcohol users in the 30 days prior to the survey) had a history of alcohol treatment since entering the Military could be cause for concern. Stated another way, some 14% of personnel who were heavy alcohol users in the 30 days prior to the survey had received treatment at some time for an alcohol-related problem, yet they were not only drinking at present, but they were drinking at a heavy level. To have been in alcohol treatment in the past, this group had likely experienced somewhat or very severe alcohol-related problems, and they could be at high risk for future alcohol-related problems. These personnel who had been in treatment but were currently heavy alcohol users could represent a group of relapsers who might be in need of a future episode of treatment.

4.6 Military and Civilian Comparisons

Results of standardized comparisons of heavy alcohol use among military personnel and civilians are presented in Table 4.8. Data for civilians are *standardized* estimates based on data from the 1994 National Household Survey on Drug Abuse (NHSDA). Thus, the standardized civilian estimates presented here may differ from any published NHSDA estimates for 1994 (e.g., SAMHSA, 1995b). Data for military personnel are U.S.-based population estimates (including personnel stationed in Alaska and Hawaii) from the 1995 DoD survey. Because the military estimates for Table 4.8 have been subsetted to U.S.-based personnel, they may not match the estimates in earlier tables, which are for the entire military population.

Findings for military/civilian comparisons of heavy drinking are presented in Table 4.8 for males and females separately and by age group (18 to 25, 26 to 55, and all ages). These findings show that the percentage of heavy drinkers generally was significantly higher among military personnel than among civilians for the U.S.-based total DoD (17.0% vs. 12.0%, respectively), even after the civilian estimates had been adjusted to reflect demographic differences between the military and civilian populations. Military males showed the same pattern of results as the total DoD, with higher rates of drinking in the Military than among civilians. In contrast, military females for the total DoD showed very similar rates, none of which was significantly different, to civilian females. With one exception, the patterns of military/civilian differences between the total DoD and civilian populations held for the individual Services. The one exception is that none of the differences between Air Force personnel and civilians was statistically significant; rates of heavy drinking among Air Force personnel were highly similar for civilians when we controlled for differences in socioeconomic composition.

Differences in military and civilian heavy drinking rates were largest for men aged 18 to 25. Among young men, the military rate was over 1.5 times as high as the standardized civilian rate (28.5% vs. 18.6%, respectively). For the individual Services, the largest discrepancies between military and standardized civilian estimates were for the

Table 4.8 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians for Persons Aged 18-55

Sex/Age Group	Civilian	Comparison Population: Total DoD	Army	Navy	Marine Corps	Air Force
Males	*N*=5,079	*N*=11,588	*N*=2,149	*N*=3,113	*N*=3,381	*N*=2,945
18-25	18.6 (1.4)	28.5 (1.2)[a]	28.1 (2.6)[a]	30.4 (2.1)[a]	38.2 (2.4)[a]	17.6 (2.0)
26-55	8.9 (0.7)	11.1 (0.7)[a]	11.9 (1.7)	13.7 (1.2)[a]	13.5 (0.9)[a]	6.9 (1.1)
All ages	13.1 (0.6)	18.7 (1.0)[a]	19.7 (2.3)[a]	20.2 (1.4)[a]	28.8 (2.4)[a]	10.6 (1.3)
Females	*N*=6,756	*N*=2,520	*N*=496	*N*=743	*N*=575	*N*=706
18-25	4.9 (0.8)	7.5 (1.1)	7.7 (2.1)	10.0 (2.4)	9.0 (2.0)	5.0 (1.0)
26-55	2.7 (0.4)	3.0 (0.9)	2.6 (1.1)	5.4 (2.9)	4.7 (1.2)	1.6 (0.8)
All ages	3.8 (0.4)	5.2 (0.9)	5.1 (1.4)	7.6 (2.7)	7.3 (1.4)[a]	3.1 (0.7)
Total	*N*=11,835	*N*=14,108	*N*=2,645	*N*=3,856	*N*=3,956	*N*=3,651
18-25	16.8 (1.2)	25.7 (1.2)[a]	25.3 (2.3)[a]	27.7 (2.2)[a]	36.9 (2.5)[a]	15.0 (1.8)
26-55	8.2 (0.6)	10.2 (0.7)[a]	10.7 (1.6)	12.9 (1.3)[a]	13.1 (0.8)[a]	6.2 (1.0)
All ages	12.0 (0.6)	17.0 (0.9)[a]	17.7 (2.2)[a]	18.9 (1.5)[a]	27.8 (2.4)[a]	9.4 (1.2)

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. Definitions and measures of substance use are given in Section 2.5.3.

[a]Significantly different from civilian estimate at the .05 significance level.

Civilian data source: National Household Survey on Drug Abuse, 1994.
Military data source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 4.8 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians for Persons Aged 18-55

Sex/Age Group	Civilian	Comparison Population: Total DoD	Army	Navy	Marine Corps	Air Force
Males	*N*=5,079	*N*=11,588	*N*=2,149	*N*=3,113	*N*=3,381	*N*=2,945
18-25	18.6 (1.4)	28.5 (1.2)[a]	28.1 (2.6)[a]	30.4 (2.1)[a]	38.2 (2.4)[a]	17.6 (2.0)
26-55	8.9 (0.7)	11.1 (0.7)[a]	11.9 (1.7)	13.7 (1.2)[a]	13.5 (0.9)[a]	6.9 (1.1)
All ages	13.1 (0.6)	18.7 (1.0)[a]	19.7 (2.3)[a]	20.2 (1.4)[a]	28.8 (2.4)[a]	10.6 (1.3)
Females	*N*=6,756	*N*=2,520	*N*=496	*N*=743	*N*=575	*N*=706
18-25	4.9 (0.8)	7.5 (1.1)	7.7 (2.1)	10.0 (2.4)	9.0 (2.0)	5.0 (1.0)
26-55	2.7 (0.4)	3.0 (0.9)	2.6 (1.1)	5.4 (2.9)	4.7 (1.2)	1.6 (0.8)
All ages	3.8 (0.4)	5.2 (0.9)	5.1 (1.4)	7.6 (2.7)	7.3 (1.4)[a]	3.1 (0.7)
Total	*N*=11,835	*N*=14,108	*N*=2,645	*N*=3,856	*N*=3,956	*N*=3,651
18-25	16.8 (1.2)	25.7 (1.2)[a]	25.3 (2.3)[a]	27.7 (2.2)[a]	36.9 (2.5)[a]	15.0 (1.8)
26-55	8.2 (0.6)	10.2 (0.7)[a]	10.7 (1.6)	12.9 (1.3)[a]	13.1 (0.8)[a]	6.2 (1.0)
All ages	12.0 (0.6)	17.0 (0.9)[a]	17.7 (2.2)[a]	18.9 (1.5)[a]	27.8 (2.4)[a]	9.4 (1.2)

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. Definitions and measures of substance use are given in Section 2.5.3.

[a]Significantly different from civilian estimate at the .05 significance level.

Civilian data source: National Household Survey on Drug Abuse, 1994.
Military data source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

younger men aged 18 to 25 in the Marine Corps (38.2%), the Navy (30.4%), and the Army (28.1%) as compared to civilian men aged 18 to 25 (18.6%).

The higher rates of 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 heavy drinking were significantly higher than among civilians even when we took such differences into account.

However, readers should note that a new data collection instrument was developed for the NHSDA and fielded for the first time in the 1994 NHSDA. To identify potential effects of the change to the new instrument, a subsample of 1994 NHSDA respondents was administered the previous version of the instrument. Comparison of heavy alcohol use estimates from the new instrument version with those from the prior version indicated that the new version of the NHSDA instrument produced somewhat higher estimates of the prevalence of heavy alcohol use in the past 30 days, particularly among young adults aged 18 to 25 (SAMHSA, 1995b). Thus, some of the military/civilian differences in Table 4.8 that were *not* statistically significant (e.g., differences in rates between military and civilian women) may reflect the increased measurement of heavy alcohol use in the 1994 civilian population based on the new NHSDA instrument.

4.7 Summary

4.7.1 Trends in Alcohol Use

In 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. With few exceptions, findings from the 1995 DoD survey generally indicate upturns in average alcohol consumption and heavy alcohol use relative to 1992, but generally these changes were not statistically significant (Tables 4.1 and 4.2).

- The *average daily amount of alcohol (ethanol)* consumed by total DoD personnel decreased from 1.48 ounces in 1980 to 0.83 ounce in 1995, a decrease of 44% in 15 years. All Services also showed similar significant decreases.

- Unadjusted rates showed significant declines in the rate of *heavy drinking* between 1980 and 1995 among total DoD personnel and for personnel in the Navy and Air Force, but not for the Army or Marine Corps.

- Adjusted estimates showed no significant decline in the rate of heavy drinking between 1980 and 1995 among total DoD personnel or for each of the Services. This indicates that sociodemographic changes in the Military between 1980 and 1995 largely explained the declines observed in the unadjusted estimates and suggests that the Military made little progress in reducing heavy drinking among its members.

- Comparisons of rates of heavy drinking between 1992 and 1995 were nonsignificant for the total DoD, the Army, the Marine Corps, and the Air Force. In contrast, the Navy showed a significant increase in the rate of heavy drinking from 1992 (13.8%) to 1995 (18.8%).

4.7.2 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 4.3).

- Comparisons of unadjusted estimates showed that *average daily ethanol* consumption in 1995 was significantly lower among Air Force personnel than among members of the other Services.

- Unadjusted rates of *heavy drinking* were significantly lower among Air Force personnel than among personnel from the other Services and significantly greater among Marine Corps personnel than among other Services. Reducing the 27.8% rate of heavy drinking among the Marine Corps may present a particularly strong challenge for the Military.

- After standardizing for demographic differences among the Services, the adjusted rates of average ethanol use and heavy drinking showed few differences from comparisons of unadjusted rates. This finding indicates that the observed differences among the Services largely were *not* explained by differences in the sociodemographic composition of the Services.

4.7.3 Correlates of Heavy 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. Logistic regression analyses showed that Service, sex, race/ethnicity, education, age, family status, and pay grade were significantly related to heavy drinking. Specifically, the probability of heavy alcohol use was higher among the following (Table 4.4):

- Army, Navy, and Marine Corps personnel than Air Force personnel;

- males than females;

- whites than other racial/ethnic groups, except Hispanics;

- those with a high school education or less and those with some college than those with more education;

- those younger than age 35 than those aged 35 or older;

- those who were single or married with spouse absent than those who were married with spouse present; and

- those in pay grades E1 to E3 through O1 to O3 than those in pay grades O4 to O10.

4.7.4 Alcohol Use Negative Effects

We measured alcohol use negative effects in terms of any serious consequences, productivity loss, and dependence symptoms (Figure 4.1).

- Alcohol-related negative effects declined significantly from 1980 to 1995. In 1995, 7.6% of all military personnel experienced at least one alcohol-related serious consequence, 16.3% had some alcohol-related productivity loss, and 5.7% showed signs of alcohol dependence (see Table 3.1).

- Alcohol-related serious consequences, productivity loss, and dependence symptoms were substantially higher among the E1 to E3 pay grades than among other pay grades.

4.7.5 Participation in Counseling

- Only 8.7% of all military personnel had received treatment for an alcohol problem since joining the Military (Table 4.7). However, 14.3% of current heavy alcohol users had a history of alcohol treatment. These heavy alcohol users may represent a high-risk group who might be in need of future treatment.

- Most of those treated had received counseling and treatment through a military treatment program rather than through a medical facility or through civilian programs and facilities.

4.7.6 Military and Civilian Comparisons

We standardized civilian data from the 1994 NHSDA to the distribution of the U.S.-based Military on sex, age, education, race/ethnicity, and marital status. We then compared military and civilian rates of heavy drinking (Table 4.8).

- Military personnel overall and military men in particular were significantly more likely to drink heavily than were their civilian counterparts (17.0% of all military personnel vs. 12.0% of civilians; 18.7% of military men vs. 13.1% of civilian men).

- Differences in military and civilian heavy drinking rates were greatest for young men aged 18 to 25. Among young men, the rate of heavy drinking for the Military was roughly 1.5 times higher than the rate for civilians (28.5% vs. 18.6%).

- The Army, Navy, and Marine Corps showed the same pattern as the total DoD in higher rates of heavy drinking among military personnel than among civilians. In contrast, the Air Force rates of heavy drinking did not differ significantly from civilian rates. Similarly, military women for the total DoD and the Army, Navy, and Air Force did not differ from their civilian counterparts.

5. ILLICIT DRUG USE

In this chapter, we examine illicit drug use among military personnel, including trends in use, Service comparisons of illicit drug use, prevalence of the use of specific drugs and classes of drugs, correlates of illicit drug use, and the relationship of illicit drug use to productivity loss. We also compare these findings to prior surveys of military and civilian populations. We have included in Appendix D additional information on sociodemographic characteristics associated with illicit drug use.

5.1 Trends in Illicit Drug Use

Drug use reported by military personnel has declined steadily since 1980 when the DoD survey series began. Table 5.1 presents trends in use for the total DoD and each of the Services during the 30 days before and the 12 months prior to when each survey was administered. Because the patterns for use in the past 30 days and past 12 months are highly similar, except that 12-month data are correspondingly higher, we focus our discussion here on past 30-day or current drug use. As shown in Table 5.1, illicit drug use for the total DoD during the past 30 days declined steeply from a high of 27.6% in 1980 to a low of 3.0% in 1995. See also Figure 3.1 in Chapter 3 where the trend line shows a curve with steep declines initially, then successively smaller declines until it flattens out. This represents a striking decrease of 89.1% over the 15-year period. Decreases were significant between each of the survey years except between 1992 and 1995. It is likely that these findings reflect, in part, societal trends in reduced drug use (SAMHSA, 1995a), as well as the strong emphasis on zero tolerance for drug use in the Military.

These decreases in any drug use for total DoD personnel were also apparent for personnel in each of the Services. All four Services showed a large and significant decline in drug use during the 15-year period between 1980 and 1995. None of the differences between the 1992 and 1995 surveys was statistically significant. The 1995 rates of use for the past 30 days and past year were similar among the Army, Navy, and Marine Corps, all of which were notably higher than for the Air Force (4% vs. 1%). Throughout the survey series, the Air Force has consistently shown the lowest rates of use. In 1995, all of the Services were either at the lowest level for the survey series or were at comparable levels to those observed in 1992.

In Chapter 2 (see Table 2.4), we noted that the demographics of Marine Corps personnel place them at higher risk of illicit drug abuse (i.e., they have a notably higher proportion than the other Services of young personnel, single males, E1 to E3 pay grades, and those with a high school education or less). Interestingly, despite these demographics, Marine Corps drug use rates were not consistently higher than the other Services. They were highest only in 1980, the baseline year for the survey series, and in

Table 5.1 Trends in Any Illicit Drug Use, Past 30 Days and Past 12 Months, by Service, 1980-1995

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

Note: Estimates are expressed as percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

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

[b]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

1992. However, even for these 2 years, statistical tests show that Marine Corps rates were not statistically different from one or more of the other Services. Thus, despite the potential for higher use, the Marine Corps has been able to contain drug use to comparable levels with the Army and Navy. As noted previously, rates of drug use were consistently lower among Air Force personnel.

5.2 Service Comparisons of Illicit Drug Use

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 past year prevalence rates in 1995, provide a perspective on the comparative magnitude of the challenge facing the Services in their efforts to eradicate drug use. These unadjusted estimates are, however, only descriptive, and yield no explanatory information on the differences among the Services. As discussed in Section 2.6, 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 direct standardization procedures to control for these differences. These adjusted or constructed estimates permit comparisons among the Services, ensuring that the sociodemographic composition of all four is the same.

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

5.2.1 Unadjusted Estimates

As shown in Table 5.2, the Army had the highest unadjusted rate of any illicit drug use (9.2%) in the past 12 months, although the Navy and Marine Corps (both 7.3%) were similar. The Army also had the highest rates of marijuana use (7.3%); the Army, Navy, and Marine Corps all had highly similar rates of use of any illicit drug use except marijuana (4.7% to 4.8%). Drug use among Air Force personnel was far below use for the other three Services on all three measures (e.g., 2.5% reporting any use in the past year vs. 7% to 9% in the other Services). These findings show the relative challenges that the Services face in combating illicit drug use. The Army, Navy, and Marine Corps face the greatest and similar challenges, whereas the Air Force with the lowest rates faces the smallest challenge.

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.

Table 5.2 Estimates of Drug Use, Past 12 Months, Unadjusted and Adjusted for Sociodemographic Differences

Drug/Type of Estimate	Service: Army	Navy	Marine Corps	Air Force
Marijuana				
Unadjusted	7.3 (1.0)[a,b]	4.7 (0.6)[a]	5.3 (1.0)[a]	1.1 (0.2)
Adjusted[c]	6.9 (0.9)[a,d]	5.0 (0.6)[a,d]	3.4 (0.5)[a]	1.5 (0.3)
Any Drug Except Marijuana[e]				
Unadjusted	4.7 (0.6)[a]	4.8 (0.5)[a]	4.8 (0.8)[a]	1.6 (0.2)
Adjusted[c]	4.6 (0.5)[a]	4.9 (0.5)[a,d]	3.5 (0.4)[a]	1.7 (0.2)
Any Drug[f]				
Unadjusted	9.2 (1.1)[a]	7.3 (0.8)[a]	7.3 (1.2)[a]	2.5 (0.4)
Adjusted[c]	8.9 (0.8)[a,d]	7.5 (0.7)[a,d]	5.2 (0.6)[a]	2.9 (0.5)

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). 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 Navy 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]Estimate is significantly different from the Marine Corps at the 95% confidence level.

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

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

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

5.2.2 Adjusted Estimates

As shown in Table 5.2, adjusting for sociodemographic differences reduced the rates of any illicit use for the Army and Marine Corps and slightly increased the rates for the Navy and Air Force. The adjustments had the largest impact on the Marines, with the estimates for use of any illicit drug dropping over a fourth (7.3% to 5.2%). Adjusted rates showed the Marine Corps rates of any illicit use and marijuana use were significantly lower than the adjusted rates for the Army and the Navy. Thus, the demographics in the Marine Corps compared to the other Services play a larger role in understanding illicit drug use rates. Although standardization increased the Air Force drug use rates slightly, the Air Force still had significantly lower adjusted rates of use for all classes of drugs shown in Table 5.2, even when we controlled for sociodemographic characteristics.

These data, coupled with the demographic profile of the Services (Table 2.4), suggest that Marine Corps efforts to combat drug use appear to have been more effective than those of the Army or the Navy. 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.

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

5.3 Prevalence of Specific Drug Use in 1995

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 5.3 presents the percentage of users of 12 specific drugs or drug classes during the 30 days and 12 months before the survey along with two summary measures, one for use of any illicit drug, and the other for use of any illicit drug except marijuana. As shown in Table 5.3, use of all specific drugs was quite low. Marijuana remained the most commonly used drug, with

Table 5.3 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	2.6	(0.7)	1.9	(0.4)	1.9	(0.5)	0.3	(0.1)	1.7	(0.3)
Past 12 months	7.3	(1.0)	4.7	(0.6)	5.3	(1.0)	1.1	(0.2)	4.6	(0.4)
Cocaine										
Past 30 days	0.4	(0.1)	0.3	(0.1)	0.3	(0.1)	0.1	(0.1)	0.3	(0.1)
Past 12 months	1.4	(0.3)	0.8	(0.2)	1.2	(0.3)	0.2	(0.1)	0.9	(0.1)
PCP										
Past 30 days	0.1	(0.1)	0.1	(**)	0.2	(0.1)	+	(+)	0.1	(**)
Past 12 months	0.2	(0.1)	0.1	(0.1)	0.6	(0.2)	**	(**)	0.2	(**)
LSD/Hallucinogens										
Past 30 days	0.6	(0.3)	0.8	(0.3)	0.9	(0.4)	0.1	(**)	0.6	(0.1)
Past 12 months	1.8	(0.5)	1.8	(0.3)	2.3	(0.6)	0.3	(0.1)	1.5	(0.2)
Amphetamines/Stimulants										
Past 30 days	0.7	(0.2)	0.5	(0.2)	0.6	(0.1)	0.2	(0.1)	0.5	(0.1)
Past 12 months	1.3	(0.2)	0.9	(0.2)	1.4	(0.3)	0.3	(0.1)	0.9	(0.1)
Tranquilizers										
Past 30 days	0.4	(0.2)	0.4	(0.2)	0.3	(0.1)	0.2	(0.1)	0.3	(0.1)
Past 12 months	0.6	(0.2)	0.9	(0.3)	0.6	(0.2)	0.4	(0.1)	0.6	(0.1)
Barbiturates/Sedatives										
Past 30 days	0.3	(0.1)	0.1	(**)	0.1	(0.1)	**	(**)	0.1	(**)
Past 12 months	0.4	(0.2)	0.3	(0.1)	0.3	(0.1)	0.1	(0.1)	0.3	(0.1)
Heroin/Other Opiates										
Past 30 days	0.1	(0.1)	+	(+)	**	(**)	**	(**)	0.1	(**)
Past 12 months	0.3	(0.1)	0.1	(0.1)	0.4	(0.1)	**	(**)	0.2	(0.1)
Analgesics										
Past 30 days	0.7	(0.1)	0.8	(0.2)	0.6	(0.2)	0.3	(0.1)	0.6	(0.1)
Past 12 months	1.0	(0.1)	1.5	(0.3)	1.0	(0.2)	0.6	(0.1)	1.0	(0.1)
Inhalants										
Past 30 days	0.5	(0.2)	0.6	(0.1)	0.6	(0.2)	0.2	(0.1)	0.4	(0.1)
Past 12 months	0.9	(0.3)	0.8	(0.1)	1.1	(0.2)	0.3	(0.1)	0.7	(0.1)
"Designer" Drugs										
Past 30 days	0.4	(0.1)	0.2	(0.1)	0.4	(0.1)	+	(+)	0.2	(**)
Past 12 months	0.8	(0.2)	0.5	(0.2)	1.1	(0.4)	0.1	(**)	0.5	(0.1)
Any Illicit Drug[a]										
Past 30 days	4.0	(0.9)	3.6	(0.6)	3.6	(0.8)	1.0	(0.2)	3.0	(0.3)
Past 12 months	9.2	(1.1)	7.3	(0.8)	7.3	(1.2)	2.5	(0.4)	6.5	(0.5)
Any Illicit Drug Except Marijuana[b]										
Past 30 days	2.5	(0.5)	2.5	(0.5)	2.6	(0.6)	0.9	(0.1)	2.0	(0.2)
Past 12 months	4.7	(0.6)	4.8	(0.5)	4.8	(0.8)	1.6	(0.2)	3.9	(0.3)
Anabolic Steroids										
Past 30 days	0.3	(0.1)	0.2	(0.1)	0.3	(0.1)	**	(**)	0.2	(0.1)
Past 12 months	0.3	(0.1)	0.3	(0.1)	0.9	(0.3)	0.1	(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).

+Low precision.

**Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

1.7% of military personnel using it during the past month and 4.6% reporting use within the past year. Thirty-day use of each of the other individual drugs was less than 1%; similarly, 12-month use of individual drugs, other than marijuana, was less than 2%. Use of anabolic steroids was rare for the total DoD and for each of the Services (generally less than 0.5%).

In examining the prevalence of specific drugs for the individual Services, we found that use typically was highly similar for the Army, Navy, and Marine Corps on all drugs except marijuana, which was higher in the Army. As noted previously, the Air Force was notably lower than the other Services on the use of individual drugs. This pattern can also be seen when examining the summary measures of any illicit drug use and any illicit drug use except marijuana.

5.4 Correlates of Illicit Drug Use

In addition to examining overall prevalence rates, we also assessed the demographic correlates of illicit drug use. Two types of analyses were conducted examining any illicit drug use during the past 12 months: descriptive prevalence analyses and multivariate logistic regression analyses. Results of both are presented in Table 5.4. Column 2 of Table 5.4 presents prevalence data for the demographic groups, and column 3 shows the odds ratios from the logistic regression.

The prevalence data indicate significant differences for Service, sex, education, age, family status, pay grade, and region. As discussed previously, Army, Navy, and Marine Corps personnel were more likely to use drugs than were Air Force personnel. Others more likely to use drugs were males, those with less education, those who were younger, those who were not married or were married but unaccompanied by their spouse, those in pay grades E1 to E6, and those stationed in the continental United States (CONUS).

For the logistic regression model, we used the probability of any drug use in the past 12 months as the dependent variable. The past year was used rather than past month because of the relatively low rates of illicit drug use. Independent variables in the model were sociodemographic and Service variables of Service, sex, race/ethnicity, education, age, family status, pay grade, and region. As shown in Table 5.4, results of the analyses showed that Service, sex, family status, pay grade, and region were significantly related to the probability of any drug use in the past 12 months.

Specifically, the probability of any illicit drug use was significantly higher among the following:

- Army, Navy, and Marine Corps personnel than Air Force personnel;
- males than females;

Table 5.4 Demographic Correlates of Any Illicit Drug Use, Past 12 Months, Total DoD

Sociodemographic Characteristic	Prevalence		Adjusted Odds Ratio[a]	95% CI of Odds Ratio[b]
Service				
Army	9.2	(1.1)	3.51	(2.43,5.08)
Navy	7.3	(0.8)	2.58	(1.77,3.76)
Marine Corps	7.3	(1.2)	1.98	(1.32,2.98)
Air Force	2.5	(0.4)	1.00	NA
Sex				
Male	6.7	(0.5)	1.39	(1.11,1.76)
Female	5.3	(0.5)	1.00	NA
Race/Ethnicity				
White, non-Hispanic	6.4	(0.5)	1.00	NA
Black, non-Hispanic	6.3	(0.7)	0.83	(0.67,1.02)
Hispanic	7.6	(1.0)	0.95	(0.73,1.24)
Other	6.8	(1.1)	0.96	(0.67,1.37)
Education				
High school or less	9.6	(0.6)	1.28	(0.80,2.04)
Some college	6.0	(0.6)	1.32	(0.82,2.15)
College graduate or higher	2.0	(0.3)	1.00	NA
Age				
20 or younger	14.9	(1.1)	1.60	(0.83,3.10)
21-25	9.4	(0.7)	1.49	(0.89,2.47)
26-34	3.9	(0.6)	0.99	(0.64,1.52)
35 or older	2.1	(0.3)	1.00	NA
Family Status				
Not married	10.6	(0.8)	1.84	(1.50,2.25)
Married, spouse not present	7.6	(1.6)	1.73	(1.16,2.60)
Married, spouse present	3.5	(0.3)	1.00	NA
Pay Grade				
E1-E3	14.3	(0.9)	5.92	(2.94,11.96)
E4-E6	5.8	(0.6)	3.35	(1.67,6.71)
E7-E9	1.5	(0.2)	1.14	(0.58,2.26)
W1-W5	1.0	(0.4)	0.61	(0.23,1.61)
O1-O3	2.0	(0.5)	1.65	(0.79,3.44)
O4-O10	1.0	(0.2)	1.00	NA
Region				
CONUS[c]	7.0	(0.6)	1.75	(1.20,2.57)
OCONUS[d]	4.4	(0.8)	1.00	NA
Total	6.5	(0.5)	NA	NA

Note: Prevalence estimates are percentages (with standard errors in parentheses). Definitions and measures of substance use are given in Section 2.5.3.

NA= Not applicable.

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

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

[c]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[d]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

- those who were single or married with spouse not present than those who were married with spouse present;
- those in pay grades E1 to E3 or E4 to E6 than those in pay grades O4 to O10; and
- those stationed in CONUS than those stationed outside the continental United States (OCONUS).

The logistic findings differed slightly from the descriptive results in that the multivariate analyses showed no effects for education or age, whereas the descriptive analyses did. Education and age may thus be correlated with other variables in the model (e.g., family status, pay grade), such that when all of the demographic and Service variables were examined simultaneously in a single analysis, no effects were attributable to education or age. Stated another way, after controlling for all of the demographic and Service variables, education and age did not contribute any additional explanation to the variation in drug use.

Pay grade and Service showed the strongest effects in the model. Junior personnel in pay grades E1 to E3 were nearly six times more likely than seniors officers in pay grades O4 to O10 to use illicit drugs, and personnel in pay grades E4 to E6 were over three times more likely. Other pay grades showed no significant difference from senior officers. Compared to personnel in the Air Force, those in the Army were 3.5 times more likely to use illicit drugs, those in the Navy were over 2.5 times more likely to use drugs, and those in the Marine Corps were nearly twice as likely to use illicit drugs during the past year. These logistic regression analyses suggest that drug use prevention efforts might best focus on lower and mid-grade enlisted personnel in the Army, Navy, and Marine Corps.

5.5 Illicit Drug Use and Productivity Loss

We also examined the relationship between illicit drug use and productivity loss. Indicators of productivity loss that were examined were being late for work, leaving work early, being hurt in an on-the-job-accident, working below one's normal level of performance, and not coming to work because of illness or injury. In prior surveys in this series, respondents were asked to attribute these work decrements to their use of illicit drugs. For the 1995 survey, we asked about these items without any attributions to illicit drugs.

Table 5.5 presents the occurrences of these items during the past 12 months for all DoD personnel, for those reporting any illicit drug use during the past 12 months, and for those reporting any illicit drug use except marijuana. Examination of the table shows several clear patterns in the data. The first pattern is that personnel who used any illicit drugs or any drug except marijuana were more likely than all DoD personnel to report

Table 5.5 Illicit Drug Use and Productivity Loss, Past 12 Months, Total DoD

Group/ Problem	Number of Occurrences, Past 12 Months			
	Any	1 Time	2 or 3 Times	4 or More Times
All Personnel				
Late for work by 30 minutes or more	28.4 (0.7)	12.5 (0.4)	11.2 (0.5)	4.7 (0.3)
Left work early	31.1 (0.5)	6.0 (0.2)	11.9 (0.4)	13.3 (0.4)
Hurt in an on-the-job accident	9.6 (0.6)	6.0 (0.4)	2.6 (0.2)	0.9 (0.2)
Worked below normal performance level	30.6 (0.6)	5.1 (0.3)	10.4 (0.3)	15.1 (0.5)
Did not come into work because of illness or injury	21.5 (0.7)	7.8 (0.2)	8.3 (0.4)	5.4 (0.3)
Any Illicit Drug Use Past 12 Months				
Late for work by 30 minutes or more	41.0 (2.3)	13.6 (1.3)	16.6 (1.6)	10.9 (1.2)
Left work early	41.1 (2.2)	4.8 (1.2)	15.9 (1.2)	20.4 (2.0)
Hurt in an on-the-job accident	19.0 (1.9)	10.4 (1.2)	6.2 (1.0)	2.4 (1.0)
Worked below normal performance level	46.5 (1.9)	6.3 (0.8)	14.9 (1.6)	25.3 (1.9)
Did not come into work because of illness or injury	21.8 (1.8)	7.1 (1.1)	8.5 (1.1)	6.2 (1.1)
Any Illicit Drug Use Except Marijuana, Past 12 Months				
Late for work by 30 minutes or more	40.7 (3.0)	11.9 (1.9)	15.9 (1.7)	12.9 (1.6)
Left work early	45.1 (3.7)	5.7 (1.6)	19.3 (2.2)	20.1 (2.2)
Hurt in an on-the-job accident	20.2 (2.6)	10.6 (1.6)	6.8 (1.3)	2.7 (1.3)
Worked below normal performance level	49.2 (3.3)	6.1 (1.1)	14.8 (2.2)	28.3 (2.9)
Did not come into work because of illness or injury	25.8 (2.6)	8.0 (1.1)	10.3 (1.4)	7.5 (1.6)

Note: Table entries are percentages (with standard errors in parentheses). Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

productivity loss from work. For example, 28.4% of all DoD personnel reported being late for work compared to about 41% of those using any illicit drug or any illicit drug except marijuana. Similar patterns occurred for leaving work early, being hurt in an on-the-job accident, and working below one's normal performance level. There was a slight pattern, but the relationship was not strong for reports of missing work due to illness or injury.

The second pattern in the data is that there is a relationship between drug use and the number of occurrences of productivity loss. As the number of occurrences increases, the association with productivity loss and drug use becomes stronger. There is very little association between drug use and productivity loss if the events happened only one time. For example, 12.5% of all personnel reported being late for work one time, compared to 13.6% of any illicit drug users and 11.9% of users of any drug except marijuana. The relationship is more noticeable for the three groups for two or three occurrences (11.2% vs. 16.6% vs. 15.9%, respectively) and very clear for four or more occurrences (4.7% vs. 10.9% vs. 12.9%).

Together, these data provide evidence that illicit drug use does have negative effects on work performance and results in lost time away from work and military duties. It also suggests that excessive occurrences of the problems captured in these items may be a red flag to indicate possible substance abuse problems by military personnel. That is, if personnel have a number of occurrences of being late for work, leaving early, or working below their normal levels, it is possible that they may be using illicit drugs. Caution, of course, must be used before jumping to this conclusion because a number of other reasons could explain these behaviors.

5.6 Comparisons with Civilian Population

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 military personnel and civilians. Table 5.6 contains standardized comparisons of drug use among military personnel and civilians during the past 30 days, with the civilian data drawn from the 1994 National Household Survey on Drug Abuse (NHSDA). Prevalence estimates for the DoD and the individual Services are actual estimates for U.S.-based personnel. We have standardized the estimates for civilians to the 1995 CONUS distribution of military personnel by sex, age, education, race/ethnicity, and marital status. Thus, both military and civilian data are for the continental United States only.

As shown in Table 5.6, the prevalence of drug use among military personnel in 1995 was approximately one-third that of civilian personnel in 1994. We found that 3.1% of all military personnel aged 18 to 55 used illicit drugs in the previous month, which was

Table 5.6 Standardized Comparisons of the Prevalence of Any Illicit Drug Use Among Military Personnel and Civilians, Past 30 Days, for Persons Aged 18-55

Sex/ Age Group	Civilian	Comparison Population: Total DoD	Army	Navy	Marine Corps	Air Force
Males	*N*=5,318	*N*=11,580	*N*=2,146	*N*=3,111	*N*=3,378	*N*=2,945
18-25	14.2 (1.1)	5.0 (0.6)[a]	6.8 (1.5)[a]	5.1 (0.9)[a]	5.3 (1.0)[a]	2.1 (0.5)[a]
26-55	7.7 (0.7)	1.8 (0.4)[a]	2.5 (0.9)[a]	2.7 (0.8)[a]	0.8 (0.2)[a]	0.4 (0.2)[a]
All ages	10.5 (0.7)	3.2 (0.4)[a]	4.6 (1.2)[a]	3.6 (0.7)[a]	3.6 (0.8)[a]	1.0 (0.2)[a]
Females	*N*=7,057	*N*=2,520	*N*=496	*N*=743	*N*=575	*N*=706
18-25	9.0 (0.8)	3.9 (0.8)[a]	4.1 (1.7)[a]	6.3 (1.8)	4.2 (1.1)[a]	1.7 (0.8)[a]
26-55	4.1 (0.5)	1.6 (0.4)[a]	1.5 (0.7)[a]	2.5 (1.0)	1.2 (0.9)[a]	1.1 (0.5)[a]
All ages	6.4 (0.5)	2.7 (0.4)[a]	2.8 (0.7)[a]	4.3 (1.1)	3.0 (0.9)[a]	1.4 (0.4)[a]
Total	*N*=12,375	*N*=14,100	*N*=2,642	*N*=3,854	*N*=3,953	*N*=3,651
18-25	13.5 (1.0)	4.9 (0.6)[a]	6.5 (1.4)[a]	5.2 (0.8)[a]	5.3 (1.0)[a]	2.0 (0.4)[a]
26-55	7.3 (0.7)	1.7 (0.3)[a]	2.4 (0.8)[a]	2.7 (0.7)[a]	0.9 (0.2)[a]	0.5 (0.2)[a]
All ages	10.0 (0.6)	3.1 (0.4)[a]	4.3 (1.0)[a]	3.7 (0.6)[a]	3.6 (0.8)[a]	1.1 (0.2)[a]

Note: Illicit drug use is defined as nonmedical use one or more times of marijuana or hashish, inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, tranquilizers, analgesics, or "designer" drugs. 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 estimate at the .05 significance level.

Civilian data source: National Household Survey on Drug Abuse, 1994.
Military data source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

significantly lower than the standardized estimate of 10.0% among civilians. Similarly, drug use for all personnel aged 18 to 55 for each of the Services was also significantly lower than use in the civilian population with similar sociodemographic characteristics.

Differences were consistent for the total DoD for both males and females and across age groups. All DoD groups had significantly lower rates of drug use than did civilians. Differences between the military and civilian populations were more pronounced for males than for females, particularly with younger males. We estimated that 3.2% of U.S.-based males in the Military aged 18 to 55 used drugs in the past 30 days compared to 10.5% of civilian males. For females, 2.7% of those aged 18 to 55 in the Military used drugs in the past month compared to 6.4% of civilians.

Each of the Services showed the same patterns as for the total DoD across the age and gender groups with one exception--Navy women. Rates of use for Navy women were lower than those of civilian women, but not *significantly* so. Otherwise, military personnel showed significantly lower rates of illicit drug use than did civilians.

As was stated in Chapter 4, a new data collection instrument was fielded in the 1994 NHSDA. To identify potential effects of the change to the new instrument, a subsample of 1994 NHSDA respondents was administered the previous version of the instrument. The two versions of the NHSDA instrument generally produced comparable estimates of any illicit drug use in the past 30 days for the total population and within most age subgroups (SAMHSA, 1995b, 1995c). The important advantage of using estimates based on the new version of the 1994 NHSDA instrument was the large sample size for the new instrument (N = 17,809) relative to the sample size for the prior instrument version (N = 4,372) (SAMHSA, 1995b, 1995c). Thus, the significant differences in Table 5.6 between the military estimates and the standardized civilian estimates of illicit drug use in the past 30 days are not likely to be due to the change to a new data collection instrument in the 1994 NHSDA.

5.7 Summary

Drug use declined steadily during the 1980s and continues to decline in the 1990s for military personnel. Indeed, drug use among military personnel in 1995 was the lowest since the survey series began. The decline in drug use among military personnel suggests that there may be a broader societal trend of reduction in drug use, as well as evidence of the effectiveness of military policies and programs directed toward reducing or eliminating drug use.

5.7.1 Trends in Illicit Drug Use

Illicit drug use among military personnel declined dramatically between 1980 and 1995, showing a significant decrease in the prevalence of drug use of nearly 90% in 15 years (see Table 5.1).

- Use of any illicit drugs decreased from 27.6% in the past 30 days in 1980 to 3.0% in 1995.
- All Services showed the same pattern of significant decreases from 1980 to 1995 observed for total DoD for illicit drug use in the past 30 days.

5.7.2 Service Comparisons of Illicit Drug Use

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

- Comparisons of unadjusted estimates showed that the rate of any illicit drug during past year drug use was lowest among Air Force personnel (2.5%) and was similar among personnel in the Army (9.2%), Navy (7.3%), and Marine Corps (7.3%). The difference between the Air Force and each of the other Services was statistically significant.
- After adjusting for demographic changes, Marine Corps drug use rates were significantly lower than those for the Army and the Navy, but higher than those for the Air Force. In view of the demographic profile of the Marine Corps, which makes its personnel at higher risk for drug use, these findings suggest that Marine Corps efforts to combat drug use have been more effective than those of the Army or the Navy.

5.7.3 Prevalence of Illicit Drug Use

Marijuana remained the drug used most commonly by military personnel, and use of other drugs was much lower (Table 5.3).

- In 1995, 1.7% of military personnel reported use of marijuana within the past month and 4.6% during the past year.
- Thirty-day use of all other individual drugs was less than 1%, and 12-month use was less than 2%.

5.7.4 Correlates of Illicit Drug Use

Illicit drug use was related to a number of sociodemographic factors. Logistic regression analyses showed that Service, sex, family status, pay grade, and region were significantly related to the probability of any drug use in the past 12 months.

Specifically, the probability of any illicit drug use was significantly higher among the following:

- Army, Navy, and Marine Corps personnel than Air Force personnel;
- males than females;
- those who were single or married with spouse not present than those who were married with spouse present;
- those in pay grades E1 to E3 or E4 to E6 than those in pay grades O4 to O10; and
- those stationed in CONUS than those stationed OCONUS.

Pay grade and Service showed the strongest effects in the model. Junior personnel in pay grades E1 to E3 were nearly six times more likely than seniors officers in pay grades O4 to O10 to use illicit drugs, and personnel in pay grades E4 to E6 were over three times more likely. Other pay grades showed no significant difference from the rates for senior officers. Compared to personnel in the Air Force, those in the Army were 3.5 times more likely to use illicit drugs, those in the Navy were over 2.5 times more likely to use drugs, and those in the Marine Corps were nearly twice as likely to use illicit drugs during the past year. These logistic regression analyses suggest that drug use prevention efforts might best focus on lower and mid-grade enlisted personnel in the Army, Navy, and Marine Corps.

5.7.5 Illicit Drug Use and Productivity Loss

Illicit drug use was positively related to productivity loss as measured by being late for work, leaving work early, being hurt in an on-the-job-accident, working below one's normal level of performance, and not coming to work because of illness or injury (Table 5.5).

- Military personnel who used any illicit drugs or any drug except marijuana were more likely than all DoD personnel to report productivity loss from work.
- As the number of occurrences increased, the association with productivity loss and drug use became stronger.

5.7.6 Military and Civilian Comparisons

We standardized civilian data from the 1994 NHSDA to the distribution of the Military on sex, age, education, race/ethnicity, and marital status. We then compared military and civilian rates of use (Table 5.6).

- Military personnel were notably and significantly less likely than civilians to use any illicit drug in the past 30 days (3.1% vs. 10.0%). This pattern held across all age groups and for males and females for the total DoD.

- Each of the Services showed the same patterns as for the total DoD across the age and gender groups with one exception; there were no significant differences for Navy women compared to civilian women.

6. TOBACCO USE

Cigarette use among military personnel has declined sharply since 1980, when the first survey in this DoD series of surveys was conducted. Even so, tobacco use in 1995 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. We present information regarding prevalence and trends in cigarette use among the Services; correlates of smoking; cigarette use and productivity loss; attempts to stop smoking; and comparisons of the prevalence of smoking between the military and civilian populations. We also present information on the prevalence of use of other forms of tobacco, including smokeless tobacco and cigars or pipes. Where relevant, we compare our findings with *Healthy People 2000* objectives pertaining to cigarette and smokeless tobacco use. We have included additional information in Appendix D about sociodemographic characteristics associated with smoking.

6.1 Cigarette Use

6.1.1 Trends in Cigarette Use, by Service

Table 6.1 shows trends for the 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 six DoD surveys. The trends for both indicators between 1980 and 1995 are similar. During the 15-year period, any cigarette use declined significantly from 51.0% to 31.9%. Any cigarette use remained relatively constant from 1980 to 1982, then showed significant declines across subsequent survey years. Heavy smoking also declined significantly, from 34.2% in 1980 to 15.0% in 1995. Like the rates for any cigarette use, heavy smoking did not change significantly between 1980 and 1982 but declined significantly thereafter. It is likely that these trends reflect, in part, societal trends in smoking and the increased emphasis on smoking cessation and prevention within the Military (DoD, 1986b, 1994).

Table 6.1 also presents trends for each of the Services from 1980 to 1995 for the prevalences of any smoking and heavy cigarette smoking during the 30 days prior to the survey (see also Tables D.1 to D.4 and D.7). The percentage of smokers (for any smoking and heavy smoking) in each of the Services was significantly lower in 1995 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. However, the only significant Service-level difference in the prevalence of any smoking from 1992 to 1995 was found among personnel in the Air Force.

Table 6.1 Trends in Cigarette Use, Past 30 Days, by Service, 1980-1995

Service/ Smoking Level	Year of Survey					
	1980	1982	1985	1988	1992	1995
Army						
Any smoking	54.3 (0.7)	54.7 (1.8)	52.0 (1.8)	43.1 (1.1)[a]	37.0 (2.0)[a]	34.1 (1.6)[b]
Heavy smoking	35.2 (0.7)	34.6 (1.4)	33.6 (1.4)	22.8 (0.7)[a]	18.0 (1.1)[a]	17.0 (0.6)[b]
Navy						
Any smoking	53.8 (1.2)	55.4 (1.0)	47.9 (1.2)[a]	43.8 (1.8)	37.1 (1.7)[a]	34.9 (1.6)[b]
Heavy smoking	37.3 (1.3)	35.7 (1.4)	34.8 (1.6)	24.6 (2.0)[a]	20.4 (0.5)[a]	16.3 (1.4)[a,b]
Marine Corps						
Any smoking	53.4 (0.6)	48.7 (0.4)[a]	42.6 (3.1)	41.3 (1.8)	39.2 (2.3)	35.0 (1.8)[b]
Heavy smoking	34.5 (0.9)	31.6 (0.7)[a]	26.1 (0.8)[a]	18.7 (2.2)[a]	20.7 (1.8)	15.0 (1.2)[a,b]
Air Force						
Any smoking	43.2 (1.8)	44.1 (1.6)	39.0 (2.3)	35.8 (1.2)	29.2 (1.4)[a]	25.1 (1.3)[a,b]
Heavy smoking	29.7 (1.3)	30.6 (1.2)	26.8 (1.7)	22.0 (0.8)[a]	14.6 (1.0)[a]	11.2 (0.8)[a,b]
Total DoD						
Any smoking	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[a,b]
Heavy smoking	34.2 (0.6)	33.5 (0.7)	31.2 (0.8)[a]	22.7 (0.7)[a]	18.0 (0.5)[a]	15.0 (0.6)[a,b]

Note: Estimates are expressed as percentages (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

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

[b]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

Cigarette smoking did decrease significantly among Navy personnel between 1982 and 1985 and between 1988 and 1992, among Army personnel between 1985 and 1988 and between 1988 and 1992, and among Air Force personnel between 1988 and 1992 and between 1992 and 1995. For Marine Corps personnel, cigarette smoking decreased significantly for consecutive surveys only between 1980 and 1982, although they showed a continuing downward pattern over time.

For heavy smoking, each of the four Services followed the DoD pattern of a significant decline from 1980 to 1995 (Table 6.1). For the total DoD and for each of the four Services, the declines in prevalences of heavy smoking from 1980 to 1995 were statistically significant. The Army, Navy, and Air Force show very similar patterns across the entire survey series, with declines in heavy smokers between 1980 and 1995 of about 18 to 21 percentage points. The Marine Corps showed a slight but not statistically significant increase in heavy smoking from 1988 to 1992, but then a significant decrease from 1992 to 1995. The Navy and the Air Force also showed significant decreases in heavy smoking from 1992 to 1995.

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 declined significantly since 1980, the rates of any smoking for DoD and the Services are all still above the 20% target rate. The Air Force, with a prevalence of 25.1%, is closest to the 20% goal.

6.1.2 Adjustments for Sociodemographic Differences in 1995

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 1995, 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 direct standardization procedures to control for sociodemographic differences (see Appendix F). These constructed estimates resulting from standardization permit comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 1995. Unadjusted and adjusted estimates for both any smoking in the past 30 days and heavy smoking are shown in Table 6.2.

Table 6.2 Estimates of Cigarette Use, Unadjusted and Adjusted for Sociodemographic Differences

Smoking Measure	Service			
	Army	Navy	Marine Corps	Air Force
Any Smoking				
Unadjusted	34.1 (1.6)[a]	34.9 (1.6)[a]	35.0 (1.8)[a]	25.1 (1.3)
Adjusted[b]	34.9 (1.0)[a,c]	33.3 (1.2)[a]	30.3 (1.0)[a]	26.9 (0.9)
Heavy Smoking				
Unadjusted	17.0 (0.6)[a]	16.3 (1.4)[a]	15.0 (1.2)[a]	11.2 (0.8)
Adjusted[b]	18.1 (0.9)[a,c,d]	15.1 (1.1)[a]	13.1 (0.8)	11.4 (0.8)

Note: Entries are percentages (with standard errors in parentheses). Heavy smoking is defined as smoking one or more packs of cigarettes per day. Other definitions and measures of substance use are given in Section 2.5.3. Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps). Differences that were statistically significant are indicated.

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

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

[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: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 6.2 shows that the unadjusted rates for both any smoking and heavy smoking were significantly lower for the Air Force (25.1% and 11.2%, respectively) than for the other three Services. Unadjusted prevalence estimates of any smoking for the other three Services were approximately 34% or 35%, and there were no significant differences between prevalences. For heavy smoking, unadjusted estimates for the Army, Navy, and Marine Corps ranged from 15.0% for the Marine Corps to 17.0% for the Army. Again, the observed rates of heavy smoking for the three Services were not significantly different.

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. 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. Specifically, the sociodemographic composition of the Air Force differed from that of the other Services in that Air Force personnel in 1995 were more likely than personnel in the other Services to be older, better educated, and married.

To examine the potential impact of 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 6.2.

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, with the exception of heavy smoking among Marines compared to Air Force personnel. With the adjusted estimates, the difference in prevalences of heavy smoking was no longer statistically significant between these two Services (13.1% for the Marine Corps and 11.4% for the Air Force).

Other comparisons of adjusted estimates are now significant where there was no statistical significance in comparisons of the unadjusted figures. For any smoking, the prevalence for Army personnel is now significantly greater than that for the Marines (34.9% vs. 30.3%). In addition, the prevalence of heavy smoking among Army personnel (18.1%) is now significantly greater than that for all three of the other Services.

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, and that sociodemographic differences do play a small role in explaining differences in prevalences among the Services. In particular, sociodemographic differences appear to have suppressed the rates of any smoking and heavy smoking for Army personnel and to have inflated both rates for Marines. Once these differences are controlled by adjusting the estimates, Army personnel now stand out as the most likely to report any smoking and heavy smoking.

However, 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 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, or they may have more negative attitudes and values about smoking.

6.1.3 Correlates of Cigarette Use

For the Military to develop sound policies and programs that meet the needs of the military organization and personnel, planners will require knowledge of the characteristics of tobacco users. In this section, we examine the sociodemographic correlates of cigarette smoking. Prevalence estimates presented in Table 6.3 are the percentages of personnel with each sociodemographic characteristic who were current smokers at the time of the survey. Significant correlates are identified by statistically significant odds ratios in a multivariate regression model predicting current smoking.

Table 6.3 presents the prevalences of current cigarette use by selected sociodemographic characteristics. As previously shown in Table 6.1, Air Force personnel were the least likely of those in the four Services to smoke (25.1%). Males were slightly more likely than females to smoke (32.7% vs. 26.3%). Among personnel in different racial/ethnic groups, black personnel were the least likely to smoke (23.4%), and white and "other" personnel were the most likely (34.4% and 32.9%, respectively). Cigarette smoking was negatively related to level of education, age, and pay grade. Unmarried personnel were more likely than married personnel living with their spouses to smoke (35.7% vs. 29.0%), but only slightly more likely than married personnel not living with their spouses (33.1%). Finally, there was virtually no difference in smoking prevalences by region of duty assignment.

In previous chapters, we noted substantial variation among pay grades in alcohol and illicit drug use, with those in the lower pay grades showing greater use. Table 6.3 and Tables D.8 and D.9 present information about cigarette smoking by pay grade. For the total DoD, the prevalence of current smoking was substantially higher among enlisted personnel (32.6% to 40.8%) than among officers (9.5% among the O1 to O3 pay grade group and 7.1% among the O4 to O10 pay grade group).

However, the relationships we observed between each of the individual demographic characteristics and current 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. Results are presented in Table 6.3.

Table 6.3 Demographic Correlates of Cigarette Use, Past 30 Days, Total DoD

Sociodemographic Characteristic	Prevalence		Adjusted Odds Ratio[a]	95% CI of Odds Ratio[b]
Service				
Army	34.1	(1.6)	1.57	(1.38,1.79)
Navy	34.9	(1.6)	1.40	(1.19,1.65)
Marine Corps	35.0	(1.8)	1.27	(1.09,1.49)
Air Force	25.1	(1.3)	1.00	NA
Sex				
Male	32.7	(0.9)	1.23	(1.10,1.38)
Female	26.3	(1.0)	1.00	NA
Race/Ethnicity				
White, non-Hispanic	34.4	(1.1)	1.00	NA
Black, non-Hispanic	23.4	(1.2)	0.44	(0.37,0.53)
Hispanic	28.1	(1.9)	0.59	(0.48,0.72)
Other	32.9	(1.6)	0.82	(0.71,0.94)
Education				
High school or less	41.0	(0.8)	2.67	(2.04,3.48)
Some college	33.3	(1.0)	2.00	(1.51,2.65)
College graduate or higher	11.5	(0.9)	1.00	NA
Age				
20 or younger	40.8	(1.5)	0.60	(0.47,0.78)
21-25	35.0	(0.9)	0.66	(0.54,0.81)
26-34	29.2	(1.4)	0.77	(0.64,0.92)
35 or older	26.9	(1.2)	1.00	NA
Family Status				
Not married	35.7	(0.9)	1.17	(1.05,1.29)
Married, spouse not present	33.1	(2.1)	1.11	(0.91,1.36)
Married, spouse present	29.0	(1.1)	1.00	NA
Pay Grade				
E1-E3	40.8	(1.0)	5.96	(4.22,8.42)
E4-E6	34.8	(1.1)	4.64	(3.47,6.19)
E7-E9	32.6	(0.8)	3.79	(2.83,5.07)
W1-W5	22.4	(2.0)	2.10	(1.47,2.99)
O1-O3	9.5	(1.0)	1.64	(1.15,2.34)
O4-O10	7.1	(0.8)	1.00	NA
Region				
CONUS[c]	31.7	(1.0)	0.95	(0.84,1.07)
OCONUS[d]	32.7	(1.4)	1.00	NA
Total	31.9	(0.9)	NA	NA

Note: Prevalence estimates are percentages (with standard errors in parentheses).

NA = Not applicable.

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

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

[c]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[d]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

For these analyses, we created a dichotomous (0,1) smoking variable. Current smokers were coded as 1, and nonsmokers were coded as 0. The logistic regression analyses estimated the odds of being a smoker. Demographic variables were independent or predictor variables in the model. Reference groups or those to whom all other categories of each demographic variable were compared are designated by a 1.00 in the adjusted odds ratio column in Table 6.3. Odds ratios greater than 1.00 indicate a greater likelihood of smoking in the comparison group relative to the reference group, and those less than 1.00 indicate a lesser likelihood. Confidence intervals of 95% indicate whether the odds ratio is significant at the .05 level or less. Any interval that includes 1.00 within its boundaries indicates that the odds ratio is not significant at the .05 level (i.e., there is no significant difference between the reference group and the comparison group).

Nearly all of the adjusted odds ratios presented in Table 6.3 were statistically significant. The only exceptions were the odds comparing married personnel not living with their spouses to those living with their spouses and the odds comparing the two regions. Results of the logistic regression analysis, then, show that the following groups are significantly more likely than the reference groups to be current smokers, even when the effects of all other demographic variables in the model are held constant:

- personnel in the Army, Navy, and Marine Corps compared to those in the Air Force;
- males compared to females;
- whites compared to all other racial/ethnic groups;
- those with some college or less compared to those with a college degree or more;
- personnel aged 35 or older compared to younger personnel;
- unmarried personnel compared to those who are married and living with their spouses; and
- those in all pay grades lower than O4 to O10.

Adjusted odds ratios associated with two of the demographic variables are worthy of further discussion. First, the magnitude of the ratios associated with age indicate that *older* personnel are more likely to be current smokers than are younger personnel even though the prevalence estimates presented in the first column of Table 6.3 show higher rates of smoking among *younger* personnel. The reason for this seemingly contradictory finding is likely due to the relationships between age and education, family status, and pay grade in this population. Younger personnel are more likely to have less education, be unmarried, and be in lower pay grades than are older personnel; and education and pay grade are negatively associated with smoking. In addition, unmarried personnel are more likely than married personnel living with their spouses to be smokers. However,

when the effects of pay grade, family status, and education are controlled as they were in the regression model, the independent effects of age can be determined. In this case, age is positively associated with current smoking when all other age-related factors are controlled.

Second, the sizes of the odds ratios associated with pay grade are quite large for the lowest grades and decrease as pay grades increase. Comparing the lowest to the highest grades, those in E1 to E3 are nearly six times more likely to smoke than those in O4 to O10. Those in grades O1 to O3, however, are only 1.64 times more likely to smoke. The sizes and pattern of these odds ratios suggest a strong negative relationship between pay grade and current smoking, even when controlling for other relevant demographic variables.

6.1.4 Cigarette Use and Productivity Loss

Data presented earlier in this chapter showed that, although the prevalence of smoking among military personnel declined between 1980 and 1995, almost a third of all personnel continued to smoke in 1995. One important question regarding this prevalence of smoking is the possible effect of this behavior on productivity within the Military. Data addressing this question are presented in Table 6.4.

As shown in Table 6.4, leaving work early was the most common type of productivity loss among all personnel (31.1%), followed closely by working below normal performance levels (30.6%), then being late for work (28.4%) and not coming to work because of illness or injury (21.5%). Being hurt in an on-the-job accident was a relatively rare event among military personnel (9.6%). Slightly higher percentages of current smokers reported being late for work (35.1%), leaving work early (34.0%), being hurt in an on-the-job accident (12.3%), and working below normal performance levels (35.1%) than did lifetime (but not current) smokers, nonsmokers, and all personnel as a whole. This pattern holds across all categories of numbers of occurrences, but the largest percentage differences between current smokers and others is not quite 10% (for being late). In addition, lifetime smokers and nonsmokers had slightly higher percentages reporting work loss due to illness or injury (23.4% and 21.9%, respectively) compared to current smokers (20.2%). Hence, any evidence to suggest that cigarette smoking might be related to productivity loss in the Military is relatively weak. Additional analyses are needed to understand this relationship more completely.

6.1.5 Attempts to Stop Smoking

Information regarding attempts to stop smoking provides valuable insights into the response of smokers in the Military to policies and programs designed to reduce smoking. For this reason, these data are particularly relevant to development of additional military smoking policies and programs.

Table 6.4 Cigarette Use and Productivity Loss, Past 12 Months, Total DoD

Group/ Problem	Number of Occurrences, Past 12 Months			
	Any	1 Time	2 or 3 Times	4 or More Times
All Personnel				
Late for work by 30 minutes or more	28.4 (0.7)	12.5 (0.4)	11.2 (0.5)	4.7 (0.3)
Left work early	31.1 (0.5)	6.0 (0.2)	11.9 (0.4)	13.3 (0.4)
Hurt in an on-the-job accident	9.6 (0.6)	6.0 (0.4)	2.6 (0.2)	0.9 (0.2)
Worked below normal performance level	30.6 (0.6)	5.1 (0.3)	10.4 (0.3)	15.1 (0.5)
Did not come into work because of illness or injury	21.5 (0.7)	7.8 (0.2)	8.3 (0.4)	5.4 (0.3)
Current Smokers[a]				
Late for work by 30 minutes or more	35.1 (1.2)	14.9 (0.7)	14.5 (0.8)	5.7 (0.4)
Left work early	34.0 (1.0)	6.9 (0.4)	13.0 (0.8)	14.2 (0.6)
Hurt in an on-the-job accident	12.3 (0.8)	7.4 (0.6)	3.6 (0.4)	1.3 (0.3)
Worked below normal performance level	35.1 (1.0)	6.4 (0.5)	12.3 (0.6)	16.5 (0.9)
Did not come into work because of illness or injury	20.2 (0.8)	7.2 (0.4)	7.8 (0.6)	5.1 (0.5)
Lifetime Smokers[b]				
Late for work by 30 minutes or more	25.2 (1.3)	10.9 (0.7)	10.1 (0.7)	4.3 (0.6)
Left work early	29.9 (1.4)	4.5 (0.6)	11.9 (0.9)	13.5 (1.0)
Hurt in an on-the-job accident	8.0 (0.7)	5.8 (0.7)	1.5 (0.4)	0.6 (0.2)
Worked below normal performance level	28.5 (1.4)	5.6 (0.7)	8.2 (0.7)	14.7 (0.9)
Did not come into work because of illness or injury	23.4 (1.3)	7.2 (0.6)	10.0 (0.8)	6.2 (0.7)
Nonsmokers[c]				
Late for work by 30 minutes or more	25.3 (0.6)	11.5 (0.5)	9.6 (0.6)	4.3 (0.3)
Left work early	29.7 (0.6)	5.7 (0.3)	11.3 (0.5)	12.7 (0.5)
Hurt in an on-the-job accident	8.4 (0.6)	5.2 (0.3)	2.3 (0.3)	0.8 (0.2)
Worked below normal performance level	28.4 (0.6)	4.3 (0.3)	9.8 (0.5)	14.3 (0.5)
Did not come into work because of illness or injury	21.9 (0.9)	8.3 (0.4)	8.2 (0.5)	5.3 (0.4)

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

[a]Smoked at least 100 cigarettes lifetime and smoked in the past 30 days.

[b]Smoked at least 100 cigarettes lifetime but did not smoke in the past 30 days.

[c]Smoked fewer than 100 cigarettes lifetime.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 6.5 presents our findings on respondents' attempts to stop smoking cigarettes during the past year. As shown in the top panel, a large percentage (54.6%) of military personnel never smoked. In the total DoD, a considerable number of personnel (13.8%) successfully stopped smoking, 10.6% over a year ago and 3.2% within the past year. An additional 15.4% made a serious but unsuccessful attempt to quit smoking within the past year, whereas 16.2% did not try to quit within this period.

Among the four Services, a higher proportion of Air Force personnel never smoked (60.3%) compared to the other Services; consequently, with the exception of former smokers who quit over a year ago, Air Force personnel had the lowest proportions in the other rows of the top panel. Otherwise, there were few differences across the Services in the proportions of former and current smokers who quit, tried to quit, or did not quit.

The lower half of Table 6.5 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, 9.3% of these smokers quit within the past year, 44.3% tried to quit but continued smoking, and 46.4% did not try to quit. Overall, then, over half (53.6%) 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. The one exception to this pattern is among Marine Corps personnel who were more likely to try to quit (49.1%) than to not try (41.2%). 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 46.4% 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.

6.1.6 Comparisons of Cigarette Use in the Military and Civilian Populations

As indicated in Section 6.1, cigarette smoking declined over time in both the military and civilian populations. However, in a previous comparison of smoking rates in military and civilian population data, we found that the prevalence rates of any smoking and heavy smoking in 1992 were still significantly higher among military personnel stationed in the United States (including Alaska and Hawaii) than among civilians, after the civilian data had been standardized to take into account demographic differences between the military and civilian populations (Bray et al., 1992). In this section, we describe comparisons of the prevalence of current smoking that we made between civilian data taken from the 1994 National Household Survey on Drug Abuse (NHSDA) and data

Table 6.5 Serious Attempt to Stop Smoking Cigarettes During the Past Year

Group/Status	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Among All Personnel					
Never smoked[a]	53.8 (1.1)	50.4 (1.5)	53.5 (1.1)	60.3 (1.4)	54.6 (0.7)
Former smoker, quit over a year ago	9.4 (0.9)	11.5 (0.6)	8.1 (0.9)	11.9 (0.5)	10.6 (0.4)
Former smoker, quit within past year	3.0 (0.4)	3.4 (0.4)	3.7 (0.3)	3.1 (0.3)	3.2 (0.2)
Current smoker, tried to quit	16.2 (1.0)	16.7 (0.9)	18.8 (1.0)	11.9 (0.7)	15.4 (0.5)
Current smoker, didn't try to quit	17.7 (1.0)	17.9 (1.1)	15.8 (1.1)	12.8 (0.8)	16.2 (0.6)
Among Smokers, Past Year					
Former smoker, quit within past year	8.1 (1.0)	8.9 (0.9)	9.7 (1.0)	11.3 (1.1)	9.3 (0.5)
Current smoker, tried to quit	44.0 (1.8)	44.0 (1.8)	49.1 (1.7)	42.7 (1.2)	44.3 (0.9)
Current smoker, didn't try to quit	47.9 (1.8)	47.2 (1.6)	41.2 (1.4)	46.0 (1.5)	46.4 (0.9)

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

[a]Smoked fewer than 100 cigarettes in the lifetime.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

from the 1995 DoD survey for military personnel who were stationed in the United States (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 Table 6.6. It should be noted that the smoking measure used in this table does include those who had smoked in the past 30 days, but to be comparable to the NHSDA measure, the other criterion of current smoking used in this report (i.e., smoking at least 100 cigarettes over one's lifetime) was not included in the measure reported in Table 6.6. 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 6.6 thus presents data on the prevalence of current smoking within different age groups and among males, females, and the total population, for the civilian and the U.S.-based military populations. The prevalence of current smoking was significantly greater among military personnel in 1995 who were between the ages of 18 and 25 (39.4%) than it was among persons in the same age group in the household population (35.5%). However, no other comparisons (ages 26 to 55 and all ages) between the military and civilian populations were significant.

In 1995, findings for the individual Services followed the general pattern for the total DoD, although different comparisons were significant; in some cases, smoking rates for military personnel were lower than those for the civilian population. In particular, the Army showed the same pattern as did the DoD comparison (only the 18- to 25-year-old comparison was significant), whereas comparisons of the other two groups (the older group and all ages together) were significant for the Navy, and all three group comparisons were significant for the Marine Corps. For all three Services, the rates of current smoking were higher for the military than the civilian population. However, for Air Force personnel, the rates were significantly lower than the civilian rates for the older group and all ages together. There was no significant difference in the younger age group of Air Force personnel.

Not surprisingly, because the Military has a majority of males, the comparisons for males in the three age groups mirror that of the total DoD and civilian population comparisons. However, only one of the comparisons among the female groups was significant. The youngest group of Marine women was significantly more likely to smoke than the comparable age group of civilian women (35.4% vs. 28.6%).

These findings indicate that although the Military has made considerable progress in reducing smoking among its personnel since the DoD survey series began in 1980, U.S.-based military personnel overall and males in the Military are still significantly more

Table 6.6 Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, for Persons Aged 18-55

Sex/ Age Group	Civilian	Comparison Population: Total DoD	Army	Navy	Marine Corps	Air Force
Males	*N*=5,261	*N*=11,320	*N*=2,149	*N*=3,113	*N*=3,381	*N*=2,677
18-25	36.6 (1.7)	40.7 (1.1)[a]	42.7 (2.6)[a]	40.0 (1.4)	45.1 (1.7)[a]	34.1 (1.1)
26-55	28.4 (1.2)	29.1 (1.5)	30.4 (3.1)	35.1 (2.4)[a]	24.7 (1.2)[a]	22.1 (2.0)[a]
All ages	31.9 (1.0)	34.2 (1.1)	36.3 (2.4)	37.0 (1.8)[a]	37.3 (1.9)[a]	26.2 (1.7)[a]
Females	*N*=7,019	*N*=2,445	*N*=496	*N*=743	*N*=575	*N*=631
18-25	28.6 (1.2)	30.9 (1.5)	30.2 (3.4)	32.1 (2.3)	35.4 (2.8)[a]	29.7 (2.5)
26-55	24.5 (1.4)	25.4 (1.8)	28.1 (2.7)	28.1 (2.8)	21.9 (2.2)	21.3 (3.3)
All ages	26.5 (0.9)	28.0 (1.3)	29.1 (2.2)	30.0 (2.2)	30.1 (2.1)	25.1 (2.4)
Total	*N*=12,280	*N*=13,765	*N*=2,645	*N*=3,856	*N*=3,956	*N*=3,308
18-25	35.5 (1.5)	39.4 (0.9)[a]	41.0 (2.1)[a]	39.0 (1.5)	44.7 (1.7)[a]	33.2 (0.9)
26-55	27.9 (1.1)	28.7 (1.3)	30.1 (2.8)	34.5 (2.3)[a]	24.6 (1.1)[a]	22.0 (1.9)[a]
All ages	31.3 (0.9)	33.4 (1.0)	35.4 (2.2)	36.3 (1.8)[a]	37.0 (1.9)[a]	26.0 (1.6)[a]

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 estimate at the .05 significance level.

Civilian data source: National Household Survey on Drug Abuse, 1994.
Military data source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

likely to smoke than are their civilian counterparts. Two encouraging findings from these comparisons are that (a) two of the prevalence rates of smoking among Air Force personnel were significantly lower than that of the civilian population, and (b) that most of the rates for females in the Military were comparable to those for females in the civilian population.

As was stated in Chapters 4 and 5, however, a new data collection instrument was developed for the NHSDA and fielded for the first time in the 1994 NHSDA. To identify potential effects of the change to the new instrument, a subsample of 1994 NHSDA respondents was administered the previous version of the instrument. Comparison of cigarette use estimates from the new instrument version with those from the prior version indicated that the new version of the NHSDA instrument produced somewhat higher estimates of the prevalence of cigarette use in the past 30 days, particularly among youth aged 12 to 17 and young adults aged 18 to 25 (SAMHSA, 1995b, 1995c). Thus, some of the military/civilian differences in Table 6.6 that were *not* statistically significant may reflect the increased measurement of cigarette use in the 1994 civilian population based on the new NHSDA instrument. Nevertheless, estimates of cigarette use in the Military among young military men were still significantly greater than civilian estimates despite standardization to take into account differences between the two populations and the somewhat higher estimates of cigarette use based on the new 1994 NHSDA instrument.

6.2 Smokeless Tobacco Use

The 1995 DoD 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 is necessary to develop comprehensive policies and programs for prevention and cessation of tobacco use. In this section, we examine data related to smokeless tobacco use.

6.2.1 Prevalence of Use, by Service

Table 6.7 presents the prevalence of current smokeless tobacco use for the total DoD and for each of the Services. It should be noted that these prevalence estimates have not been adjusted for sociodemographic differences among Services. As shown, 13.2% of all military personnel used smokeless tobacco. Males of all ages (15.0%) were more likely than females in the Military (only 0.7%) to report smokeless tobacco use. Among males, prevalences of use decrease sharply as the age of personnel increases. Nearly 22% of males aged 18 to 24 reported smokeless tobacco use, but only 5.5% of those aged 35 and older reported such use.

Comparisons across the four Services show that personnel in the Marine Corps had the highest prevalence of use (24.0%) and those in the Air Force had the lowest (7.9%). The second highest prevalence was for Army personnel (15.3%), although this prevalence

Table 6.7 Prevalence of Smokeless Tobacco Use, Past 30 Days

Group	Service: Army	Navy	Marine Corps	Air Force	Total DoD
All Personnel	15.3 (1.1)	12.0 (1.7)	24.0 (1.4)	7.9 (1.0)	13.2 (0.7)
Females, All Ages	1.3 (0.5)	0.3 (0.3)	1.6 (0.8)	0.4 (0.2)	0.7 (0.2)
Males					
All ages	17.4 (1.1)	13.4 (1.7)	25.1 (1.3)	9.3 (1.1)	15.0 (0.7)
Ages 18-24	21.5 (1.4)	21.2 (2.7)	30.6 (1.0)	15.9 (1.6)	21.9 (1.0)
Ages 25-34	18.6 (1.5)	12.2 (1.5)	21.2 (2.2)	9.0 (1.1)	13.9 (0.7)
Ages 35+	7.3 (1.0)	4.6 (0.9)	11.6 (1.4)	3.3 (0.9)	5.5 (0.5)

Note: Entries are percentages of personnel who used smokeless tobacco at least 20 times in the lifetime and who used it in the past 30 days (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

was not much different than that for Navy personnel (12.0%). This pattern across the four Services was also found within each age group of male personnel. It should be noted that 62% of all the personnel in the Marine Corps were aged 25 or younger in 1995, compared with 48% of Army personnel, 41% of Navy personnel, and 36% of Air Force personnel; moreover, the Marine Corps had a higher proportion of males than did the other Services (see Table 2.4). Therefore, differences in smokeless tobacco use between the Marine Corps and the other Services may in part reflect these differences in demographics.

The related *Healthy People 2000* objective is to reduce current smokeless tobacco use by males aged 24 or younger 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). As shown in Table 6.7, 21.9% of males aged 18 to 24 in the DoD used smokeless tobacco in the past month. This and the prevalence estimates for young men in all four Services were still well above the 4% prevalence objective. 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.

6.2.2 Adjustments for Sociodemographic Differences

As mentioned in the previous section, one possible explanation for the higher prevalences of smokeless tobacco use among Marines compared to personnel in the other three Services is that the Marine Corps' sociodemographic composition is different from that of the other Services. To examine the possibility that differences in rates of

smokeless tobacco use might have been due to sociodemographic differences across the Services, we present adjusted prevalence estimates in Table 6.8. These estimates were calculated by standardizing the sociodemographic compositions of the Services to the sex, age, education, race/ethnicity, and marital status distributions for the total DoD (see Appendix F).

Table 6.8 Smokeless Tobacco Use, Past 30 Days for All Personnel and for Males, Unadjusted and Adjusted for Sociodemographic Differences

	Service			
Group/Estimate	**Army**	**Navy**	**Marine Corps**	**Air Force**
All Personnel				
Unadjusted	15.3 (1.1)[a,b]	12.0 (1.7)[a,b]	24.0 (1.4)[a]	7.9 (1.0)
Adjusted[c]	15.6 (0.8)[a,b,d]	12.3 (1.1)[a,b]	19.7 (1.0)[a]	8.3 (0.8)
Males, All Ages				
Unadjusted	17.4 (1.1)[a,b]	13.4 (1.7)[a,b]	25.1 (1.3)[a]	9.3 (1.1)
Adjusted[c]	17.6 (0.9)[a,b,d]	14.0 (1.2)[a,b]	22.3 (1.2)[a]	9.5 (0.9)

Note: Entries are percentages of personnel who used smokeless tobacco at least 20 times in their lifetime and who used it in the past 30 days (with standard errors in parentheses).

[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.

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

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Significance tests of differences between the unadjusted estimates of smokeless tobacco use across the Services for all DoD personnel and for males of all ages indicate several significant differences between Services. Marines were significantly more likely to use smokeless tobacco than were personnel in all three of the other Services; conversely, Air Force personnel were significantly less likely to use smokeless tobacco than those in all of the other Services.

When estimates were adjusted for sociodemographic differences, these significant differences remained. In fact, Army personnel were significantly more likely than those in the Navy to use this type of tobacco. Sociodemographic differences across services, then, did not appear to explain the observed differences in rates of smokeless tobacco use. For whatever reasons, Marines were the most inclined to use this type of tobacco, and Air Force personnel were the least inclined toward this behavior.

6.3 Cigar and Pipe Use

Table 6.9 presents the unadjusted prevalence of cigar and pipe use for the total DoD, for males of all ages and of the three age groups, for females of all ages, and for each of the Services. As shown, 18.7% of all military personnel smoked cigars or pipes in the 12 months prior to the 1995 survey. This rate was up slightly, but not significantly, from the 17.1% rate reported in 1992 (Bray et al., 1992). Information from future surveys will help determine whether this slight upturn from 1992 to 1995 might be signaling the start of a trend toward increasing use of cigars or pipe tobacco.

Table 6.9 Prevalence of Cigar or Pipe Use, Past 12 Months, for All Personnel and for Males

	Service				
Group	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
All Personnel	22.1 (1.5)	17.1 (1.5)	28.4 (1.3)	12.8 (0.7)	18.7 (0.7)
Females, All Ages	2.6 (0.7)	2.5 (0.6)	4.0 (0.7)	1.0 (0.4)	2.1 (0.3)
Males					
All Ages	25.0 (1.5)	18.9 (1.5)	29.6 (1.3)	15.1 (0.7)	21.1 (0.8)
Ages 18-24	31.1 (1.7)	23.6 (1.9)	33.4 (1.6)	20.2 (1.5)	27.3 (1.0)
Ages 25-34	24.8 (1.4)	18.3 (1.5)	25.8 (1.1)	15.5 (1.1)	20.0 (0.8)
Ages 35+	13.3 (1.3)	13.4 (1.8)	21.7 (1.9)	9.3 (1.1)	12.7 (0.8)

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

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 6.9 also shows that males of all ages had higher prevalences of cigar and pipe use than did females (21.1% compared to only 2.1%) and that younger males had higher rates than did older males (27.3% for the youngest group compared to 12.7% for the oldest group). In addition, Marines (28.4%) were more likely to smoke cigars and pipes than were personnel in the other Services (12.8% to 22.1%). This difference across the four Services also held within each age group.

6.4 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.

6.4.1 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 1995 DoD

survey, which show smoking levels at their lowest since the survey series began in 1980 (see Tables 6.1 and 6.2).

- The prevalence of any cigarette smoking for the total DoD declined from 51.0% in 1980 to 31.9% in 1995. For all four Services, the prevalence of any cigarette smoking in 1995 was also significantly lower relative to the start of the survey series in 1980.

- The prevalence of heavy cigarette smoking (one or more packs per day) for the total DoD also showed a significant decline from 34.2% in 1980 to 15.0% in 1995. We observed similar overall trends in the decline in heavy smoking relative to 1980 for all four of the Services.

- 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 set for military personnel by *Healthy People 2000*.

- 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 small role in explaining Service differences in smoking.

6.4.2 Correlates of Smoking

Development of sound policies and programs regarding smoking requires knowledge of characteristics of tobacco users. We compared the prevalences of current smoking across various demographic groups and tested for the simultaneous effects of these demographic characteristics in a multivariate logistic regression model (see Table 6.3).

- In the Military, males were significantly more likely than females to be current smokers (32.7% vs. 26.3%).

- Whites (34.4%) were significantly more likely than personnel in all other racial/ethnic groups to smoke (blacks, 23.4%; Hispanics, 28.1%; others, 32.9%).

- Cigarette smoking was significantly and negatively related to education, with 41.0% of personnel with a high school education being smokers, compared to only 11.5% of personnel with a college degree or higher.

- Prevalence estimates suggested that age was negatively associated with smoking, but odds ratios in the logistic regression model showed that the relationship was significant but positive. Older military personnel were found to be more likely to smoke than younger personnel once factors related to age, such as education, family status, and pay grade, were simultaneously controlled.

- Unmarried personnel were significantly more likely than married personnel living with their spouses to be current smokers (35.7% vs. 29.0%).

- Pay grade was negatively and strongly related to current smoking. Personnel in pay grades E1 to E3 were almost six times more likely to smoke than those in pay grades O4 to O10 (40.8% vs. 7.1%).

6.4.3 Attempts to Stop Smoking

Information about attempts to quit smoking provides useful insights about needs for additional program emphasis and groups likely to be receptive to "quit smoking" messages.

- In the total DoD, 13.8% of all personnel successfully stopped smoking, with 3.2% having quit in the past year (Table 6.5). Overall, 18.6% of all military personnel were current or former smokers who had tried to quit in the past year; 15.4% made a serious, but unsuccessful, attempt to quit. Overall, nearly 55% of military personnel never smoked.

- During the past year among those who smoked, 53.6% made an attempt to quit smoking. However, only 9.3% of the personnel who were smokers in the past year successfully quit.

6.4.4 Military and Civilian Comparisons

Using the 1995 DoD survey data and 1994 NHSDA data, we compared rates of *current* smoking among the military and civilian populations after we adjusted the civilian data to reflect the demographic characteristics of the military population (see Table 6.6).

- Younger military personnel (ages 18 to 25) showed higher rates of current smoking (39.4%) compared to civilians in the same age group (35.5%). However, comparisons of rates for older age groups and for all ages of military and civilian personnel were not significantly different.

- Comparisons between the Army and civilian estimates showed the same pattern as that for the total DoD. Air Force personnel were significantly *less* likely than civilians to smoke, whereas personnel in the Navy and Marine Corps were significantly more likely than civilians to smoke.

- Only one comparison for females was significant--young women in the Marines were more likely than young civilian women to smoke (35.4% vs. 28.6%).

6.4.5 Other Tobacco Use

Planners and policymakers must be aware of the prevalences of other tobacco use (smokeless tobacco, cigars, and pipes) and cigarette use before they can develop comprehensive policies and programs for smoking prevention and cessation (see

Tables 6.7 through 6.9). Considerable effort is needed to achieve the *Healthy People 2000* objective of 4% current smokeless tobacco use among males aged 24 and younger.

- Overall, 13.2% of military personnel used smokeless tobacco in the past 30 days. Use was highest among men aged 18 to 24 (21.9%). Between 16% and 22% of young men in the Army, Navy, and Air Force used smokeless tobacco products in the past 30 days. Nearly 31% of the young men in the Marine Corps used smokeless tobacco in this time period.

- Marines (24.0%) were significantly *more* likely than personnel in the Army (15.3%), Navy (12.0%), and Air Force (7.9%) to use smokeless tobacco.

- An estimated 18.7% of military personnel smoked cigars or a pipe in 1995 (Table 6.9), a slight but nonsignificant increase from 17.1% in 1992.

- Males had higher rates of cigar and pipe use than did females in the Military (21.1% vs. 2.1%). Younger males had higher rates than did older males (27.3% for the youngest group vs. 12.7% for the oldest group). Rates of use were substantially higher among Marine Corps personnel (28.4%) than personnel in the other Services (12.8% to 22.1%).

Taken together, findings from the 1995 DoD survey indicate that the Military has made considerable progress since 1980 in reducing the prevalence of cigarette smoking among its personnel. Overall, military rates were not significantly different from civilian rates, although younger military personnel were more likely to smoke than were their civilian counterparts. Nonetheless, the rates of any cigarette smoking in the total DoD (32%) and in all four Services (25% to 35%) were all still well above the *Healthy People 2000* target of 20% for the Military.

Smokeless tobacco use in the Military, and particularly among young males, is also cause for concern. Nearly 22% of all military men ages 24 and younger used smokeless tobacco in the past 30 days, and nearly 31% of young men in the Marine Corps used smokeless tobacco in this time period. 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. HEALTH BEHAVIOR AND HEALTH PROMOTION

As was discussed in Chapter 1, a major aim of the 1995 DoD survey was to develop baseline estimates to measure progress toward *Healthy People 2000* objectives for a variety of health behaviors. The 1995 survey contained items on cardiovascular disease risk reduction, injuries and injury prevention, and sexually transmitted disease (STD) risk reduction, including knowledge and beliefs about the acquired immune deficiency syndrome (AIDS). In this chapter, we present findings related to each of these issues and discuss them relative to the appropriate *Healthy People 2000* objectives.

7.1 Cardiovascular Disease Risk Reduction

The health benefits of regular physical exercise and proper weight control have been well documented. Regular physical activity can reduce the risks of coronary heart disease, can prevent or help control high blood pressure, and is important for weight control (Paffenbarger, Hyde, Wing, & Hsieh, 1986; PHS, 1991; Piani & Schoenborn, 1993; Siscovick, LaPorte, & Newman, 1985). Moreover, physical exercise can have positive mental health benefits, such as reducing depression or anxiety (Taylor, Sallis, & Needle, 1985). Conversely, a sedentary lifestyle, characterized by a lack of physical exercise, nearly doubles a person's risk for coronary heart disease and has been linked to an increased likelihood of other cardiovascular problems. Similarly, people who are overweight are at increased risk for a variety of chronic medical problems, including hypertension, heart disease, and diabetes (PHS, 1991).

In addition, high blood pressure and elevated serum cholesterol levels are known risk factors for coronary heart disease and stroke, the first and third leading causes of death in the United States (CDC, 1993a; Dawber, 1980; PHS, 1991). If these conditions are detected, however, they can be controlled or reversed through behavioral changes, such as dietary changes, exercise, stress management, and medication (PHS, 1991). In the Military, early detection of these conditions is likely to be facilitated by access to medical care and regulations mandating that personnel receive preventive medical services on a regular basis.

In this section, we present findings from the 1995 DoD survey related to overweight, exercise, high blood pressure screening and control, and cholesterol screening among military personnel. We also compare 1995 survey findings with the following *Healthy People 2000* objectives:

- reduce overweight, as measured by the Body Mass Index (BMI) to a prevalence of no more than 20% among people aged 20 and older and no more than 15% among people under age 20;

- increase to at least 20% the proportion of people aged 18 or older who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion;

- increase 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;

- increase to at least 90% the proportion of people with high blood pressure who are taking action to help control their blood pressure; and

- increase to at least 75% the proportion of adults who had their blood cholesterol checked within the preceding 5 years.

7.1.1 Overweight and Exercise

Table 7.1 presents findings on the prevalence of overweight among active-duty military personnel, by age and gender, calculated from self-reports of weight and height. Consistent with the definition of overweight used in *Healthy People 2000*, estimates of the prevalence of overweight in Table 7.1 were based on the BMI, or the ratio of a person's reported weight in kilograms to the square of that person's reported height in meters. Military men were defined as overweight if they were under the age of 20 and had a BMI of 25.8 or greater, or if they were aged 20 or older and had a BMI of 27.8 or greater. Military women were defined as overweight if they were under the age of 20 and had a BMI of 25.7 or greater, or if they were aged 20 or older and had a BMI of 27.3 or greater.

For individuals under age 20, approximately 19% of all personnel, 21% of males, and 11% of females would be classified as overweight according to the BMI. Thus, women in the total DoD under the age of 20 had met the *Healthy People 2000* objective of having a prevalence of overweight of no more than 15%. In contrast, the estimates for all personnel and for military men under age 20 were somewhat above this target of 15%. Similarly, the Navy estimate of overweight for women under the age of 20 was below the target of 15%, and the Service-level estimates for all personnel and for men were above this target. However, the overall Army estimate for personnel under age 20 was only slightly above this target.

As was discussed in Chapter 3, the *Healthy People 2000* objective for overweight among people aged 20 or older (prevalence of no more than 20%) had been met for personnel in this age group in the total DoD (16.7%) (Table 3.3). This *Healthy People 2000* objective for overweight among people aged 20 or older had been met among personnel aged 20 to 25 and personnel aged 26 to 34 for both men and women in the total DoD and for most of the Services. Exceptions were Navy personnel aged 26 to 34 as a whole (22.9%) and Navy men aged 26 to 34 (24.1%). Estimates of overweight among

Table 7.1 Prevalence of Overweight Among Active-Duty Personnel, by Age and Gender

Gender/Age Group	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Males[a]										
Under 20	19.3	(1.9)	20.8	(4.1)	23.9	(2.3)	20.2	(3.5)	20.8	(1.5)
20-25	12.8	(0.9)	17.3	(1.2)	8.9	(0.9)	10.3	(0.9)	12.8	(0.6)
26-34	16.7	(1.7)	24.1	(1.5)	11.1	(1.3)	19.2	(1.5)	19.3	(0.8)
35 or older	19.4	(1.6)	29.2	(0.9)	14.0	(1.5)	25.5	(1.5)	23.9	(0.8)
Females[b]										
Under 20	+	(+)	14.1	(3.7)	+	(+)	+	(+)	10.5	(2.6)
20-25	5.0	(1.6)	9.2	(2.5)	1.1	(0.8)	4.6	(1.1)	5.6	(0.9)
26-34	11.8	(3.2)	12.0	(2.0)	2.7	(1.6)	5.2	(1.1)	9.1	(1.3)
35 or older	14.8	(2.2)	9.7	(2.1)	2.3	(1.4)	10.3	(3.4)	11.4	(1.7)
Total DoD										
Under 20	17.4	(2.1)	19.2	(3.4)	22.8	(2.2)	18.0	(2.5)	19.0	(1.4)
20-25	11.8	(0.9)	16.4	(1.2)	8.6	(0.9)	9.2	(0.8)	11.9	(0.6)
26-34	16.0	(1.7)	22.9	(1.3)	10.7	(1.2)	17.2	(1.4)	18.1	(0.8)
35 or older	18.8	(1.5)	27.5	(1.0)	13.6	(1.4)	23.5	(1.5)	22.6	(0.8)

Note: Table entries are percentages of personnel meeting criteria for being overweight (with standard errors in parentheses). Overweight was defined in terms of the Body Mass Index (BMI), where BMI = (Weight in kilograms) ÷ (Height in meters)^2. Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

[a]Defined as being overweight if BMI ≥ 25.8 for men under age 20 or BMI ≥ 27.8 for men aged 20 or older.

[b]Defined as being overweight if BMI ≥ 25.7 for women under age 20 or BMI ≥ 27.3 for women aged 20 or older.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

military women aged 20 to 25 and 26 to 34 in the total DoD and the Services were all considerably lower than the objective of 20% set for the year 2000.

Among personnel aged 35 or older, the *Healthy People 2000* objective for overweight had been met by all Army and Marine Corps personnel, by men in the Army and Marine Corps, and among women in the total DoD and all four Services; however, the estimates for Army men and all Army personnel were only slightly below the target of 20%. The prevalence of overweight among Marine Corps women aged 35 and older was particularly low (2.3%). Among personnel aged 35 or older, the *Healthy People 2000* objective for overweight had not been met for personnel as a whole or for men in the total DoD, Navy, and Air Force.

As was discussed in Section 3.2.2, the finding that military personnel under age 20 had not met the *Healthy People 2000* objective for overweight was somewhat surprising, especially given that the objective *had* been met for personnel who were aged 20 or older (Table 3.3). However, readers should use caution in interpreting these estimates, and particularly those for younger personnel, because the BMI may overestimate somewhat the percentages of military personnel who are overweight. Specifically, some BMI measurements among military personnel that are over the threshold for classifying someone as overweight may be due to increased muscle mass, rather than to excess body fat. Thus, some of these personnel who are classified as overweight may still have percentage body fat measurements that are within acceptable ranges for their Services. Alternatively, some junior personnel may indeed be somewhat overweight upon entry to the Military but may still be within their Services' acceptable limits for percentage body fat. Once these personnel have been in the Military for a longer period of time and have been exercising regularly, their weights may eventually decrease. This interpretation may help explain why some estimates of overweight in older age groups were lower than the estimates among personnel under the age of 20.

Table 7.2 presents data on the percentages of military personnel who engaged in strenuous exercise at least 3 days per week for at least 20 minutes per occasion in the past 30 days. As indicated by the bottom row, nearly two-thirds of personnel in the total DoD engaged in regular strenuous physical exercise for 20 minutes or more at least 3 times a week. However, approximately 80% of personnel in the Army and Marine Corps engaged in regular strenuous exercise, compared with approximately 50% to 58% of personnel in the Air Force and Navy. Nevertheless, the total DoD and the four Services were all considerably above the *Healthy People 2000* objective of 20% or greater for the general adult population. Given the emphasis on physical fitness as part of an overall goal of military readiness, this finding is not surprising.

Table 7.2 Involvement in Strenuous Exercise, Past 30 Days

Activity	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Run, cycle, or walk 20 minutes or more	75.7 (2.0)	49.7 (1.7)	72.2 (0.9)	41.8 (1.5)	58.2 (1.1)
Other strenuous exercise 20 minutes or more (e.g., swimming laps)	44.4 (1.4)	34.5 (1.3)	50.1 (1.1)	30.0 (0.7)	38.1 (0.7)
One or both types of strenuous exercise 20 minutes or more	80.9 (1.7)	57.8 (1.3)	78.8 (0.9)	50.6 (1.3)	65.4 (0.9)

Note: Entries are percentages of personnel involved in strenuous exercise (with standard errors in parentheses). Data are percentages of personnel who engaged in the activity 3 to 4 days per week or more often in the past 30 days.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Even though the total DoD and the four Services in 1995 had greatly exceeded the *Healthy People 2000* target for the general adult population, variations could still exist according to such factors as gender and pay grade. In particular, officers might be less likely than enlisted personnel to engage in regular exercise if exercise requirements for officers are less stringent.

Table 7.3 presents information on exercise for the total military population, by gender and pay grade.[1] Little variation in the prevalence of regular strenuous exercise was observed for men and women or across pay grade groups. This finding could indicate that factors other than mandatory frequency and duration of exercise are motivating many personnel to exercise regularly, particularly higher-level officers. What is not known, however, is whether junior enlisted personnel might be less likely to exercise regularly if their exercise requirements were less stringent.

7.1.2 Blood Pressure

7.1.2.1 Blood Pressure Checks and Awareness. Table 7.4 presents findings on percentages of personnel who had their blood pressure checked in the 2 years prior to the survey who were also aware of the result. We classified personnel as *not* meeting these criteria if they (a) last had their blood pressure checked more than 2 years before

[1]Estimates by gender and pay grade are not presented for the individual Services because of the loss in precision associated with further subsetting the Service-level data by gender and pay grade, particularly for female officers within the individual Services.

Table 7.3 Involvement in Strenuous Exercise, Past 30 Days, by Gender and Pay Grade, Total DoD

Pay Grade	Gender: Males	Gender: Females	Total DoD
E1-E3	67.9 (1.7)	62.2 (2.6)	67.1 (1.6)
E4-E6	64.5 (1.3)	61.6 (1.8)	64.2 (1.1)
E7-E9	64.5 (1.3)	61.6 (3.0)	64.3 (1.3)
W1-W5	74.0 (2.0)	+ (+)	73.9 (1.8)
O1-O3	69.5 (1.7)	65.4 (4.7)	68.9 (1.7)
O4-O10	66.3 (1.9)	57.5 (3.9)	65.4 (1.8)
Total	65.9 (1.1)	62.0 (1.6)	65.4 (0.9)

Note: Entries are percentages (with standard errors in parentheses). Data are percentages of personnel who ran, cycled, vigorously walked, or engaged in some other kind of strenuous exercise for 20 minutes or more on 3 or more days a week in the past 30 days.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

the survey, (b) could not recall when they last had their blood pressure checked, or (c) were not aware of the result of their last blood pressure check, even if it occurred in the past 2 years. Because some personnel may have had their blood pressure checked in the past 2 years but could not recall when they last had it checked, the estimates in Table 7.4 may be somewhat conservative.

Overall, about 75% of personnel in the total DoD, Army, and Navy had their blood pressure checked in the past 2 years and could state the result; about 80% of Air Force and 70% of Marine Corps personnel reported similarly. These overall rates for the total DoD and the Services were all somewhat lower than the *Healthy People 2000* target of 90% of adults having their blood pressure checked in the preceding 2 years and being able to state whether their blood pressure was normal or high.

However, this *Healthy People 2000* objective was reached for Air Force personnel who had at least a 4-year college education (90.5%). Rates were also close to the target for college graduates in the total DoD and the other Services and for personnel aged 35 and older in the total DoD and all four Services.

Table 7.4 Blood Pressure Screening and Awareness, by Selected Sociodemographic Characteristics

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	75.8 (1.9)	73.7 (2.3)	69.5 (1.6)	80.5 (0.9)	75.7 (1.0)
Female	80.7 (1.7)	77.1 (2.1)	76.0 (1.5)	84.1 (1.3)	80.8 (1.0)
Race/Ethnicity					
White, non-Hispanic	78.3 (1.6)	76.7 (2.5)	70.6 (1.9)	81.5 (1.0)	78.0 (1.0)
Black, non-Hispanic	73.2 (2.2)	69.4 (3.5)	74.1 (2.0)	82.7 (1.4)	74.5 (1.4)
Hispanic	74.4 (2.9)	63.9 (3.2)	61.9 (2.7)	78.5 (3.4)	70.4 (1.6)
Other	71.6 (6.1)	71.1 (2.9)	66.7 (3.0)	74.7 (3.3)	71.7 (2.2)
Education					
High school or less	69.9 (1.8)	68.8 (2.8)	63.9 (2.0)	70.0 (1.7)	68.5 (1.2)
Some college	77.3 (2.1)	74.9 (2.1)	74.3 (3.0)	80.9 (1.0)	77.7 (1.0)
College graduate or higher	86.2 (1.5)	86.5 (1.8)	87.4 (2.6)	90.5 (1.2)	87.9 (0.9)
Age					
20 or younger	67.0 (3.2)	62.1 (3.6)	55.0 (3.0)	66.2 (1.9)	63.3 (1.7)
21-25	70.6 (1.9)	64.3 (2.4)	65.7 (2.0)	73.2 (1.4)	68.9 (1.1)
26-34	79.6 (2.2)	78.1 (2.0)	80.3 (1.2)	84.2 (1.0)	80.7 (1.0)
35 or older	87.0 (0.9)	85.4 (1.4)	84.7 (1.6)	89.0 (1.0)	87.0 (0.6)
Total	76.4 (1.8)	74.1 (2.1)	69.8 (1.6)	81.1 (0.9)	76.3 (0.9)

Note: Table entries are percentages of personnel who had their blood pressure checked in the 2 years prior to the survey and who knew the result (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Additional key findings from Table 7.4 on demographic correlates of blood pressure screening and awareness of the results include the following:

- Military women were somewhat more likely than military men to have had their blood pressure checked in the past 2 years and to be aware of the results.

- Little variation was observed among racial/ethnic groups in the Military in terms of the likelihood of personnel getting their blood pressure checked in the past 2 years and knowing the result.

- The likelihood of personnel having their blood pressure checked in the past 2 years and knowing the result was inversely related to education and age. Specifically, rates were lower among personnel with no education beyond high school compared with rates among college-educated personnel. Similarly, rates were lower among personnel aged 20 or younger compared with rates among personnel aged 35 or older.

These general patterns held for the total DoD and across all four Services.

We also examined whether the differences by education and age were due to differences in when personnel last had their blood pressure checked or to differences in awareness of the results. Personnel with lower levels of education and younger personnel were *less* likely than other personnel to be able to recall when they last had their blood pressure checked. In addition, personnel with lower levels of education and younger personnel were *more* likely than their counterparts not to know the results of their last blood pressure check, or not to have been told the result. Specifically, 11% of personnel with a high school education or less, 15% of personnel aged 20 and younger, and 11% of personnel aged 21 to 25 were unable to recall when they last had their blood pressure checked (data not shown). In comparison, fewer than 5% of personnel in the older age groups and 6% or less of personnel with higher educational levels were unable to recall when they last had their blood pressure checked (data not shown).

Similarly, 11% of personnel with a high school education or less and 16% of personnel aged 20 or younger were unable to recall the result of their last blood pressure check; an estimated 13% of personnel in both of these groups were apparently not told the result (data not shown). In contrast, only 2% to 2.5% of personnel who had graduated from college or who were aged 35 or older were unable to recall the result of their last blood pressure checks. Approximately 5% of personnel with a 4-year college degree and 7% of personnel aged 35 or older were not told the result (data not shown).

In addition, our estimates suggest that about 2% of personnel with a high school education or less and about 3% of personnel aged 25 or younger would have indicated that they *never* had their blood pressure checked, compared with fewer than 0.5% of personnel with at least a 4-year college degree or who were aged 35 or older (data not shown).

However, physical examinations at enlistment and regularly thereafter would make it virtually impossible for someone in the Military *never* to have had his or her blood pressure checked. What these results suggest is that a small percentage of military personnel, and particularly younger and less educated personnel, may not have realized that their blood pressure was being measured.

Taken together, these findings do not necessarily mean that younger or less educated personnel are less likely to have had their blood pressure checked. Rather, these results indicate that these personnel are less likely to be aware of when they last had their blood pressure checked or to be aware of the result when they did have it checked. Thus, efforts geared toward increasing the percentages of personnel who had their blood pressure checked in the past 2 years and can state the result may need to focus on communicating blood pressure results in terms that will be readily understandable, particularly for personnel with lower levels of education. Although the 1995 DoD survey was not designed to collect information on the procedures followed by military health care providers, these results suggest that younger and less educated personnel may need extra assistance in understanding what their blood pressure readings mean.

7.1.2.2 High Blood Pressure Screening and Awareness. Table 7.5 shows percentages of personnel who had ever been told by a doctor or other health professional that they had high blood pressure (hypertension). These estimates do not include women whose high blood pressure occurred only during pregnancy. Altogether, an estimated 12.8% of all active-duty military personnel in 1995 had a lifetime history of hypertension, or approximately one in eight personnel. Overall rates for the Army and Air Force were similar to the total DoD rate (12.7% and 12.2%, respectively). The overall rate for the Navy (14.4%) was slightly higher, and the Marine Corps rate (10.4%) was lower than the rates for the total DoD and the other Services.

Additional highlights from Table 7.5 on demographic correlates of a lifetime history of high blood pressure include the following:

- Military men were more likely than military women to have a history of high blood pressure. Among Navy men, for example, the lifetime prevalence of high blood pressure was more than twice the prevalence among Navy women. Similarly, for the total DoD and the Army, the lifetime rates of high blood pressure among men were nearly twice the rates for women.

- Black military personnel were somewhat more likely than white or Hispanic personnel to have a lifetime history of high blood pressure.

Table 7.5 Lifetime Prevalence of High Blood Pressure, by Selected Sociodemographic Characteristics

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	13.5 (0.8)	15.2 (1.2)	10.6 (0.8)	13.3 (0.8)	13.6 (0.5)
Female	7.1 (0.8)	7.5 (0.9)	6.3 (1.1)	6.5 (0.8)	7.0 (0.5)
Race/Ethnicity					
White, non-Hispanic	11.9 (0.8)	13.8 (1.0)	9.9 (0.9)	11.6 (0.7)	12.1 (0.4)
Black, non-Hispanic	15.1 (1.5)	17.9 (2.1)	15.1 (1.5)	18.5 (1.3)	16.6 (0.9)
Hispanic	13.4 (2.7)	10.3 (1.8)	8.0 (0.8)	7.4 (1.2)	10.3 (1.1)
Other	10.8 (2.4)	16.1 (2.4)	10.3 (3.4)	11.0 (2.7)	12.9 (1.4)
Education					
High school or less	11.4 (1.2)	13.9 (0.9)	9.4 (0.8)	6.8 (1.1)	11.2 (0.6)
Some college	13.2 (0.9)	14.4 (1.5)	12.0 (0.7)	13.6 (0.9)	13.5 (0.6)
College graduate or higher	13.8 (1.5)	15.5 (1.2)	11.0 (1.5)	13.6 (1.0)	14.0 (0.7)
Age					
20 or younger	6.4 (1.2)	6.9 (1.6)	6.7 (0.8)	3.9 (1.1)	6.1 (0.7)
21-25	9.8 (1.2)	9.7 (0.9)	8.5 (1.1)	7.1 (1.0)	8.9 (0.6)
26-34	13.3 (1.7)	14.2 (1.7)	12.7 (1.2)	12.7 (1.2)	13.3 (0.8)
35 or older	20.5 (1.6)	23.6 (1.5)	16.8 (1.4)	19.0 (1.3)	20.7 (0.8)
Total	12.7 (0.7)	14.4 (1.0)	10.4 (0.7)	12.2 (0.7)	12.8 (0.4)

Note: Table entries are percentages of personnel who had ever been told by a physician or other health professional that they had high blood pressure (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

- Estimates of a lifetime history of high blood pressure tended to be lower among personnel with a high school education or less. However, this finding should be interpreted in the light of lower rates of blood pressure screening and awareness of results among this group (Table 7.4).

These general patterns held for the total DoD and across all four Services. The findings of higher lifetime rates of hypertension among blacks in the Military are also consistent with findings from civilian epidemiologic surveys, such as the National Health Interview Survey (NHIS) (Piani & Schoenborn, 1993; Schoenborn, 1988) and the National Health and Nutrition Examination Survey (NHANES) (Drizd, Dannenberg, & Engel, 1986). For civilian men and women, NHIS findings indicate a higher prevalence of a history of hypertension among women than among civilian men, based on a report of two or more elevated blood pressure readings (Piani & Schoenborn, 1993; Schoenborn, 1988). However, the higher rate among civilian women could be related to greater health care utilization among women.

As noted above, the lower rates of a lifetime history of high blood pressure among personnel with lower levels of education need to be interpreted in light of their lower rates of screening and awareness of results. Consequently, people with lower levels of education might be equally likely or more likely than personnel with higher levels of education to have high blood pressure, but the former may be less likely to be aware of the fact. If that is the case, then personnel with lower levels of education could be at increased risk for more serious medical problems stemming from their hypertension, or they may require more extensive intervention and treatment to control their blood pressure once they are aware of their condition.

7.1.2.3 Blood Pressure Advice or Interventions. For military personnel who had a lifetime history of hypertension, Table 7.6 presents information on the percentages of these personnel who had received different types of medical advice or intervention related to blood pressure control. These types of advice or intervention included

- giving a prescription for blood pressure medication (i.e., the implicit advice being to take the medication),
- advising dietary changes to reduce a person's weight,
- advising reductions in sodium intake, and
- recommending exercise.

We included in the 1995 DoD survey questions about these specific types of advice or intervention for comparability with similar NHIS measures of advice to control high blood pressure.

Table 7.6 Actions Taken to Control High Blood Pressure

Characteristic	N	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Advice[a]	2,235[b]					
Medication prescribed		18.6 (2.7)	25.3 (1.3)	15.9 (2.5)	21.3 (2.0)	21.3 (1.2)
Diet to reduce weight		18.6 (1.9)	31.6 (1.8)	13.2 (2.5)	30.4 (2.2)	25.5 (1.1)
Decrease salt intake		50.4 (2.4)	48.5 (1.6)	37.7 (2.4)	48.7 (2.0)	48.2 (1.1)
Exercise		38.7 (2.0)	57.6 (3.1)	31.1 (3.7)	56.1 (2.5)	48.9 (1.5)
Any of the above		62.6 (2.3)	69.0 (2.1)	51.5 (2.3)	66.5 (2.1)	64.7 (1.2)
Action Being Taken by Lifetime Hypertensives[c]	2,235[b]					
Take prescribed medication		12.2 (2.3)	12.5 (1.5)	7.6 (1.4)	12.3 (1.2)	11.9 (0.9)
Diet to reduce weight		12.1 (1.7)	20.2 (2.3)	8.6 (2.3)	17.5 (1.7)	15.9 (1.0)
Decrease salt intake		33.9 (2.2)	34.4 (2.2)	22.3 (2.8)	36.6 (1.9)	33.8 (1.1)
Exercise		31.7 (2.4)	42.3 (2.3)	22.2 (2.5)	42.6 (2.3)	37.2 (1.3)
Any of the above		47.2 (2.3)	53.7 (2.4)	32.9 (2.7)	52.0 (2.0)	49.3 (1.3)
Action Being Taken by Probable Current Hypertensives[d]	866[e]					
Take prescribed medication		20.1 (3.4)	17.3 (2.4)	14.0 (3.7)	18.3 (2.3)	18.3 (1.5)
Diet to reduce weight		18.2 (3.1)	25.0 (3.9)	8.2 (2.6)	19.4 (2.7)	20.1 (1.8)
Decrease salt intake		46.5 (3.8)	42.1 (3.1)	29.2 (6.9)	43.2 (3.7)	42.8 (2.0)
Exercise		40.8 (3.1)	52.4 (3.1)	31.4 (5.4)	53.4 (2.8)	47.1 (1.8)
Any of the above		60.7 (3.1)	63.6 (4.0)	43.5 (7.9)	61.4 (2.6)	60.6 (2.1)

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

[a]Advice given by a doctor or other health professional.

[b]Unweighted number of respondents in the total DoD sample who had ever been told they had high blood pressure.

[c]Estimates based on personnel with a lifetime history of high blood pressure. Personnel "taking action" are those who were advised by a health professional to take a particular action to control high blood pressure and were following this advice at the time of the survey.

[d]Defined as personnel who (a) had ever been told they had high blood pressure, (b) had their blood pressure checked in the past 2 years, and (c) last blood pressure reading was high.

[e]Unweighted number of respondents in the total DoD sample who (a) had ever been told they had high blood pressure, (b) had their blood pressure checked in the past 2 years, and (c) last blood pressure reading was high.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

The top set of rows in Table 7.6 indicates the types of medical advice given to military personnel who had ever had a history of high blood pressure. Slightly less than two-thirds of military personnel (64.7%) who had a history of high blood pressure were advised to take one or more of the actions shown in the table; the percentage of Marine Corps personnel who had been advised to take one or more of these actions (51.5%) was somewhat lower than the corresponding percentages for the total DoD and the other Services.

Recommendations to exercise and to reduce salt intake were the most common forms of medical advice indicated in the table (48.9% and 48.2%, respectively, for the total DoD). Only about one in four personnel with a history of high blood pressure in the total DoD were advised to diet to reduce their weight, and one in five such personnel were given a prescription for blood pressure medication. The lower rates of personnel receiving prescriptions for blood pressure medication might mean that attempts were being made to control most people's high blood pressure through behavioral changes first, before medical professionals resorted to a pharmacological intervention.

In comparison, findings from the 1990 NHIS suggest that higher percentages of adults in the civilian population were advised to take one or more of these actions to control their high blood pressure. According to the 1990 NHIS, nearly 90% of people with hypertension in the adult civilian population (88.7%) had been advised by a doctor or other health professional to take one or more of these actions (CDC, 1994f). Unlike the military population, taking antihypertensive medication was more commonly recommended to civilian adults with hypertension (recommended to 73% of civilian adults with hypertension) than it was for military personnel with a history of high blood pressure. In addition, exercise was less commonly recommended for civilian adults with hypertension (recommended to 47.9%) than it was for military personnel with a history of high blood pressure.

The lower rate of medication being prescribed for military personnel with a history of high blood pressure may reflect the younger age composition of the Military, health and fitness standards for enlistment that can screen out less healthy applicants, the emphasis on fitness and readiness, and almost universal access to preventive medical services in the Military. Consequently, the Military has the potential to detect hypertension among its personnel relatively early and at less seriously elevated levels. In addition, younger personnel may be more amenable to behavior changes, such that military health care providers might try behavioral interventions before resorting to blood pressure medication. In contrast, the higher rate of antihypertensive medication being prescribed in the civilian population may reflect prior unsuccessful attempts among older adults to control high blood pressure other than through medication. If some segments of the civilian population are less likely to get routine medical checkups, their high blood pressure may also not be detected until it has reached potentially dangerous levels, at

which time medication may be needed to stabilize or reduce their blood pressure fairly quickly. Alternatively, the differences between the military and civilian populations in terms of use of antihypertensive medication could reflect a tendency among civilian health care providers to resort to medication before trying other, less expensive approaches.

However, readers are cautioned that these estimates of medical advice given to military personnel may be somewhat conservative, in that they are based on survey respondents' ability to recall whether they had been given a particular form of advice to control their high blood pressure. Thus, some respondents with a history of high blood pressure may actually have been advised to take one or more of these actions but did not indicate this. In addition, some personnel may have been advised to take other actions to control their high blood pressure.

7.1.2.4 Actions to Control High Blood Pressure. The middle set of rows in Table 7.6 indicates percentages of military personnel with a lifetime history of high blood pressure who (a) had been advised by a doctor or other health professional to take a particular action to control their high blood pressure, and (b) were currently following this advice. We developed this measure based on the structuring of blood pressure control questions in the NHIS.

Overall, less than half of personnel who had a lifetime history of high blood pressure (49.3%) were currently taking one or more of these four recommended actions to control their high blood pressure. As above, the rate for the Marine Corps was lower than the corresponding rates for the total DoD and the other Services. Among personnel with a history of high blood pressure, about 42% to 43% of these personnel in the Navy and Air Force, 32% of these personnel in the Army, and approximately 22% of these personnel in the Marine Corps were currently following advice to exercise as a way to control their blood pressure. Similarly, about 34% to 37% of lifetime hypertensive personnel in the total DoD, Army, Navy, and Air Force were currently taking the action of decreasing their salt intake based on medical advice. Only about 22% of Marine Corps personnel with a history of high blood pressure were currently taking this action.

Lower percentages of personnel with a lifetime history of high blood pressure were currently dieting or taking blood pressure medication (16% and 12%, respectively, for the total DoD). However, the lower rates of personnel currently taking blood pressure medication may reflect changes in the form of intervention to reduce or control their blood pressure. Specifically, if some personnel's blood pressure had been lowered sufficiently through medication, they may have been taken off the medication completely, in the hope that control of their blood pressure could be maintained through behavioral changes only.

When one considers personnel who have had a lifetime history of high blood pressure, these findings indicate that considerably fewer than 90% were currently taking

action to control their high blood pressure, which is the *Healthy People 2000* objective for people with high blood pressure. However, some of these personnel may not have been currently taking any of these actions if their blood pressure had returned to normal. Nevertheless, those personnel who had a history of high blood pressure but were not taking any of these actions to control their high blood pressure are a group at increased risk for a recurrence of the problem.

These estimates of current action to control high blood pressure were also considerably lower than estimates from the 1992 DoD survey. These estimates in 1992 were based on actions taken by personnel who had been told in the past 12 months that they had high blood pressure. In 1992, nearly 90% of personnel in the total DoD who had been told by a health professional in the past 12 months that they had high blood pressure had engaged in one or more of the following actions: (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 (Bray et al., 1992). However, this 1992 estimate is not strictly comparable to the 1995 estimate of action taken to control high blood pressure; the 1992 estimate covered a broader range of actions than those in Table 7.6, and the question in 1992 asked whether people were taking any of these actions to improve their *health*, not necessarily to lower their blood pressure. The 1992 estimate was also based on personnel taking these actions regardless of whether a health professional had advised them to do so.

Although the 1992 estimate of actions taken to control high blood pressure is not strictly comparable to the 1995 estimate, one possible explanation for the much lower estimate in 1995 is that it included personnel who have *ever* had a history of high blood pressure. Estimates of action being taken to control high blood pressure could be closer to the 1992 estimate if they were based on personnel who were likely to be *currently* hypertensive, just as the 1992 estimates were based on personnel who had been told in the recent past that they had high blood pressure.

Therefore, we also examined actions to control blood pressure among the subset of personnel with a lifetime history of high blood pressure who (a) had their blood pressure checked within the past 2 years, and (b) their last blood pressure reading was high. These estimates make up the bottom set of rows in Table 7.6. Among these personnel with a lifetime history of high blood pressure whose most recent reading in the past 2 years was elevated, 61% were taking one or more of the actions shown in Table 7.6. This rate was still well below the *Healthy People 2000* objective of increasing to at least 90% the percentage of people with high blood pressure who are taking action to control their blood pressure. In addition, this rate was still much lower than the percentage of personnel in 1992 who were told they had high blood pressure in the past 12 months and were taking some form of action.

As for the group of personnel who had any lifetime history of high blood pressure, the most common actions taken among this subgroup of personnel with recent elevated blood pressure readings were exercise (47.1%) and dietary changes to decrease their salt intake (42.8%). More than half of these personnel in the Navy and Air Force were currently exercising to lower their blood pressure based on a medical advice. This rate was somewhat lower in the Army (40.8%) and was still lower in the Marine Corps (31.4%). Similarly, the percentage of these Marine Corps personnel who were reducing their salt intake based on medical advice to do so (29.2%) was considerably lower than the corresponding percentages in the other Services (approximately 42% to 47%).

7.1.3 Cholesterol

Table 7.7 presents findings on recency of cholesterol screening. Findings are presented for specific age groups and for the overall total DoD and Service populations because requirements for cholesterol screening are likely to be age-dependent. As indicated by Woodruff and Conway (1991), for example, Navy regulations do not require personnel under the age of 25 to be screened for 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 60% of all personnel in the total DoD and more than 65% of Army and Air Force personnel had their cholesterol checked within the preceding 5 years. In comparison, slightly less than 55% of all Navy personnel and less than 40% of all Marine Corps personnel had their cholesterol checked within the past 5 years. These overall rates for the total DoD, Army, and Air Force were somewhat lower than the *Healthy People 2000* target of 75% of adults having their serum cholesterol checked within the preceding 5 years. The overall rates for the Navy and Marine Corps were considerably lower than this target of 75%. However, the lower rate of cholesterol screening among Marine Corps personnel may be due in part to the younger age composition of this Service; these younger personnel may not be required to have their cholesterol checked. Similarly, the fact that the overall rates for the Military were below the target of 75% may be due in part to the younger age composition of the Military relative to the age composition of the civilian population. In comparison, the higher rate of cholesterol screening among the overall Air Force population may reflect the somewhat older age composition of the Air Force.

In addition, if we had been able to survey the entire active-duty military population, a sizable percentage (16.4%) would have been unable to recall when they last had their cholesterol checked. The inability to recall the recency of cholesterol screening was considerably higher among younger personnel (25.8% of personnel under the age of

Table 7.7 Cholesterol Screening, by Age

Age Group/ Recency	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Under 25					
Within past 2 years	45.6 (3.8)	26.6 (1.6)	20.3 (2.0)	30.1 (4.6)	33.0 (1.9)
Within past 5 years	52.8 (4.3)	32.8 (1.8)	24.2 (2.1)	35.9 (4.7)	39.1 (2.0)
More than 5 years ago	1.1 (0.3)	1.4 (0.3)	0.8 (0.2)	1.5 (0.4)	1.2 (0.2)
Never	23.8 (3.3)	37.6 (2.1)	43.3 (2.1)	38.7 (3.2)	34.0 (1.5)
Don't know	22.3 (1.7)	28.2 (2.3)	31.7 (1.3)	23.8 (2.0)	25.8 (1.0)
Ages 25 to 49					
Within past 2 years	60.8 (2.9)	50.3 (2.2)	43.1 (2.3)	58.8 (2.7)	55.6 (1.4)
Within past 5 years	78.5 (1.8)	65.8 (2.4)	57.4 (1.9)	78.7 (1.9)	73.2 (1.2)
More than 5 years ago	4.1 (0.5)	4.1 (0.6)	4.6 (0.6)	5.4 (0.7)	4.5 (0.3)
Never	7.1 (1.2)	17.4 (1.8)	22.4 (1.3)	8.3 (0.8)	11.8 (0.8)
Don't know	10.3 (0.9)	12.6 (0.8)	15.6 (1.2)	7.6 (0.6)	10.5 (0.4)
Ages 50 or Older					
Within past 2 years	85.2 (5.3)	77.6 (5.9)	+ (+)	84.8 (4.7)	83.7 (2.9)
Within past 5 years	+ (+)	89.5 (3.9)	+ (+)	+ (+)	95.2 (1.9)
More than 5 years ago	+ (+)	8.3 (3.6)	+ (+)	+ (+)	3.1 (1.4)
Never	+ (+)	+ (+)	+ (+)	+ (+)	0.5 (0.5)
Don't know	+ (+)	+ (+)	+ (+)	+ (+)	+ (+)
Total					
Within past 2 years	54.5 (3.1)	42.0 (2.2)	30.1 (2.5)	50.3 (3.0)	47.0 (1.5)
Within past 5 years	67.7 (2.9)	54.2 (2.6)	38.3 (2.5)	66.1 (2.5)	60.1 (1.5)
More than 5 years ago	2.8 (0.3)	3.1 (0.4)	2.4 (0.3)	4.2 (0.6)	3.3 (0.2)
Never	14.1 (2.1)	24.6 (1.6)	34.4 (1.8)	17.3 (1.4)	20.3 (0.9)
Don't know	15.3 (1.0)	18.1 (1.2)	24.9 (1.0)	12.4 (0.9)	16.4 (0.6)

Note: Table entries are percentages (with standard errors in parentheses). Estimates do not sum to 100% because categories "within past 2 years" and "within past 5 years" are not mutually exclusive. Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

25), compared with 10.5% of personnel aged 25 to 49. However, at least some of these personnel might have had it checked in the past 5 years. Hence, the estimates of cholesterol screening in the past 5 years in Table 7.7 may be somewhat conservative.

Although the overall percentages of personnel in the total DoD and the Services who had their cholesterol checked within the past 5 years were all below the *Healthy People 2000* target of 75%, this objective had been reached in 1995 among

- personnel aged 25 to 49 in the Army and Air Force, and
- personnel aged 50 or older in the total DoD, Army, and Navy.

In addition, the percentage of personnel aged 25 to 49 in the total DoD who had their cholesterol checked within the past 5 years (73.2%) was close to the *Healthy People 2000* objective. Estimates for Army, Marine Corps, and Air Force personnel aged 50 or older are not shown in Table 7.7 because of low precision of these estimates.

Although the estimates for screening in the past 5 years among Army and Air Force personnel aged 50 or older were of low precision, the estimates for personnel aged 50 or older in these two Services who had their cholesterol checked within the past 2 years were of acceptable precision and were above the *Healthy People 2000* target for screening in the past 5 years. This result suggests that this objective has also been reached among Army and Air Force personnel aged 50 or older. In addition, more than 75% of Navy personnel aged 50 or older and more than 80% of personnel aged 50 or older in the total DoD had their cholesterol checked within the past 2 years. As noted above, these high rates of cholesterol screening in the past 2 years for personnel aged 50 or older are probably related to requirements for more frequent screening among this age group.

Table 7.8 shows estimates of the lifetime prevalence of elevated cholesterol among military personnel, including estimates for military men and military women under age 25, ages 25 to 49, and ages 50 or older. We based these estimates according to whether survey respondents reported having ever been told by a doctor or other health professional that their cholesterol level was high.

In the total DoD population, approximately 18% of all personnel and of military men and 15% of military women had been told by a health professional that they had elevated cholesterol at some point in their lives. However, nearly half of all personnel and nearly half of military men (47% in both instances) who were aged 50 or older at the time of the survey had a lifetime history of elevated cholesterol. (Estimates for military women aged 50 or older and several other Service-level estimates for personnel in this age group were of low precision and are not shown in Table 7.8.)

Table 7.8 Lifetime Prevalence of Elevated Cholesterol, by Gender and Age

Gender/Age Group	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
Male					
Under 25	7.7 (1.2)	3.6 (1.2)	2.1 (0.5)	3.1 (0.7)	4.7 (0.5)
25 to 49	29.0 (1.5)	23.9 (1.3)	16.8 (1.3)	28.6 (0.7)	26.3 (0.6)
50 or older	42.9 (8.1)	+ (+)	+ (+)	+ (+)	47.0 (5.0)
Total	20.0 (1.5)	17.0 (1.2)	8.3 (1.1)	21.5 (0.8)	18.2 (0.6)
Female					
Under 25	5.8 (1.2)	5.3 (1.9)	4.0 (1.4)	6.4 (1.8)	5.8 (0.9)
25 to 49	21.3 (2.0)	17.3 (1.5)	13.3 (1.2)	24.9 (1.4)	21.5 (1.0)
50 or older	+ (+)	+ (+)	+ (+)	+ (+)	+ (+)
Total	15.0 (1.6)	12.0 (1.4)	8.0 (0.9)	18.0 (1.5)	15.0 (0.9)
Total					
Under 25	7.4 (1.1)	3.9 (1.1)	2.2 (0.5)	3.7 (0.9)	4.8 (0.5)
25 to 49	28.0 (1.4)	23.3 (1.1)	16.6 (1.2)	28.1 (0.7)	25.7 (0.6)
50 or older	+ (+)	+ (+)	+ (+)	+ (+)	47.1 (5.7)
Total	19.4 (1.4)	16.5 (1.1)	8.3 (1.0)	20.9 (0.8)	17.8 (0.6)

Note: Table entries are percentages of personnel who had ever been told by a doctor or other health professional that they had high cholesterol (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Among personnel aged 25 to 49, approximately one in four of all DoD personnel (25.7%), one in four military men (26.3%) and one in five military women (21.5%) had a lifetime history of elevated cholesterol. The prevalence of elevated cholesterol among Marine Corps personnel aged 25 to 49 tended to be lower than the corresponding rates in the other three Services.

Although findings from Table 7.8 suggest very low rates of elevated cholesterol among personnel under the age of 25, these findings should be interpreted in light of the lower rates of cholesterol screening among this age group. As shown in Table 7.7, more than one-third of personnel under the age of 25 and more than 40% of Marine Corps personnel under the age of 25 had never had their cholesterol checked. Similarly, the lower prevalences of elevated cholesterol among Marine Corps personnel aged 25 to 49 may reflect lower rates of cholesterol screening among Marine Corps personnel in this age group; more than one in five Marine Corps personnel aged 25 to 49 had never had their cholesterol checked (22.4%), compared with only 7% to 8% of personnel aged 25 to 49 in the Army and Air Force (Table 7.7). Consequently, elevated serum cholesterol may be going undetected among some younger personnel and Marine Corps personnel.

7.2 Injuries and Injury Prevention

Injuries sustained in motor vehicle crashes are a leading cause of death in all age groups up to age 44 (CDC, 1992, 1994b). An estimated 46,000 people are killed and 3.5 million people are injured in motor vehicle crashes each year (PHS, 1991). Use of seat belts substantially reduces the risk of serious injury or death in motor vehicle crashes, and many States now have laws requiring motor vehicle occupants to use seat belts (PHS, 1991; Piani & Schoenborn, 1993). As of 1991, 41 States and the District of Columbia (DC) had mandatory seat belt use laws (NCHS, 1993).

In addition, nearly 30% of motor vehicle fatalities involve injuries among motorcyclists, bicyclists, and pedestrians (PHS, 1991). However, helmet use by motorcyclists and bicyclists can substantially reduce the risk of head injuries in a crash or fall (Sacks, Holmgreen, Smith, & Sosin, 1991; Sosin, Sacks, & Holmgreen, 1990; Thompson, Rivara, & Thompson, 1989). As of 1991, 23 States, DC, and Puerto Rico had laws requiring motorcyclists to use helmets (NCHS, 1993).

In this section, we present findings from the 1995 DoD survey related to the prevalence of injuries requiring hospitalization and behaviors that are designed to reduce the risk of injury, such as seat belt use and helmet use. As part of this discussion, we compare 1995 survey findings with the following *Healthy People 2000* objectives:

- reduce nonfatal unintentional injuries that require hospitalization to no more than 754 per 100,000 people;

- increase use of occupant protection systems, such as safety belts, inflatable safety restraints, and child safety seats, to at least 85% of motor vehicle occupants; and

- increase use of helmets to at least 80% of motorcyclists and at least 50% of bicyclists.

7.2.1 Prevalence of Injuries

Table 7.9 presents estimates of the prevalence of hospitalization for treatment of injuries in the 12 months prior to the survey. To obtain these estimates, we asked respondents whether they had any overnight hospital stays in the past 12 months for treatment of an injury. Unlike most other estimates in this report, which are expressed as percentages, the estimates shown in Table 7.9 are presented as the number of personnel hospitalized for treatment of injuries per 100,000 active-duty personnel.

Except for officers in the O1 to O3 pay grade group in the total DoD and Navy, and Air Force personnel in the "other" race/ethnicity category, all other estimates in Table 7.9 were considerably higher than the *Healthy People 2000* target of 754 per 100,000 people. In particular, out of every 100,000 active-duty personnel in the total DoD, approximately 3,400 were hospitalized for treatment of an injury in the past 12 months, or more than four times the target rate for the year 2000. For the individual Services, rates of hospitalization for injuries in the past 12 months were approximately 2,300 per 100,000 in the Air Force, 2,600 per 100,000 in the Navy, 3,600 per 100,000 in the Marine Corps, and 5,000 per 100,000 in the Army. However, the *Healthy People 2000* objective pertaining to hospitalization for injuries had been met among junior officers in the total DoD and Navy, and among Air Force personnel in the "other" race/ethnicity category.

Additional highlights from Table 7.9 include the following:

- Men and women were about equally likely to have been hospitalized for treatment of injuries in the past 12 months.

- Hispanic personnel in the Marine Corps were somewhat less likely than white and black Marine Corps personnel to have been hospitalized for injuries.

- Except for the Marine Corps, personnel with a college education or higher were somewhat less likely than personnel with no education beyond high school to have been hospitalized for treatment of an injury.

- Personnel aged 26 to 34 in the total DoD and the Army were somewhat less likely than personnel in other age groups to have been hospitalized for treatment of an injury.

Table 7.9 Hospitalization for Injuries, Past 12 Months, by Selected Sociodemographic Characteristics

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	4,993 (688)	2,520 (481)	3,564 (396)	2,379 (243)	3,388 (262)
Female	5,063(1,198)	3,242 (485)	4,300 (878)	1,823 (608)	3,383 (465)
Race/Ethnicity					
White, non-Hispanic	5,005 (724)	2,495 (460)	3,696 (570)	2,281 (210)	3,294 (254)
Black, non-Hispanic	4,583(1,023)	2,323 (473)	5,551(1,461)	3,286 (682)	3,800 (491)
Hispanic	6,188(1,177)	3,464(1,089)	1,593 (911)	1,957(1,128)	3,774 (587)
Other	4,711(2,169)	3,105(1,253)	1,717(1,079)	316 (312)	2,792 (800)
Education					
High school or less	7,043(1,146)	2,946 (619)	3,658 (625)	3,450 (618)	4,412 (417)
Some college	4,284 (824)	2,677 (442)	3,643 (772)	2,257 (171)	3,133 (304)
College graduate or higher	2,950 (552)	1,490 (525)	3,178 (696)	1,395 (321)	2,029 (263)
Age					
20 or younger	7,155(1,635)	4,807 (706)	4,470 (803)	3,841 (875)	5,431 (651)
21-25	5,913(1,345)	2,667 (406)	3,734 (860)	2,050 (447)	3,769 (499)
26-34	3,568 (634)	1,533 (685)	3,053 (834)	2,190 (491)	2,467 (321)
35 or older	4,267 (775)	3,109 (857)	2,886 (522)	2,248 (352)	3,142 (363)
Marital Status					
Not married	4,912 (822)	3,017 (442)	3,847 (501)	2,528 (557)	3,655 (330)
Married	5,067 (624)	2,333 (620)	3,340 (601)	2,173 (323)	3,212 (283)
Pay Grade					
E1-E3	6,054(1,206)	4,635 (682)	4,296 (943)	3,989 (671)	4,863 (468)
E4-E6	5,428(1,157)	2,140 (683)	3,475 (697)	2,257 (284)	3,338 (419)
E7-E9	4,031 (585)	2,778 (484)	3,140 (392)	2,149 (412)	3,038 (276)
W1-W5	3,795(1,394)	1,891 (959)	1,937 (835)	NA NA	3,234 (973)
O1-O3	914 (501)	633 (345)	1,730 (450)	+ (+)	556 (181)
O4-O10	5,372 (992)	1,741 (455)	2,649 (902)	2,510 (813)	3,253 (500)
Region					
CONUS[a]	4,790 (699)	2,422 (507)	3,881 (462)	2,441 (302)	3,300 (267)
OCONUS[b]	5,724(1,065)	4,003 (52)	2,654 (636)	1,733 (190)	3,760 (485)
Total	5,002 (603)	2,602 (441)	3,598 (393)	2,291 (241)	3,388 (235)

Note: Table entries are estimates per 100,000 active-duty personnel who had any overnight hospital stays in the past 12 months for treatment of an injury (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

NA: Not applicable.

+Low precision.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

- The rates of hospitalization for injuries in the past 12 months among personnel in the O1 to O3 pay grades in the total DoD, Army, and Navy were considerably lower than the rates in other pay grade groups, including senior officers.

Although these estimates indicate some subgroup differences in rates of hospitalization for injuries, no clear pattern is evident across the entire military population or even within the Services. Rather, key conclusions from the findings in Table 7.9 are that the Military has high rates of hospitalization for injuries, and that effort will be needed in the military population as a whole and in each of the Services to reduce the prevalence of injuries requiring hospitalization to no more than 754 per 100,000 personnel by the year 2000. These findings also suggest the need for further research on injuries among military personnel to gain a better understanding of possible reasons underlying these rates of hospitalization for injuries. For example, these rates may reflect physically demanding characteristics of the military job that might result in personnel getting injured. In addition, the access to medical care as part of the military health care system could mean that fewer chances are taken when someone gets hurt; thus, personnel who experience certain injuries may be more likely than civilians experiencing similar injuries to be hospitalized overnight for observation.

7.2.2 Seat Belt Use

Table 7.10 shows percentages of personnel who wore seat belts "always" or "nearly always" when they drove or rode in an automobile. Altogether, approximately 90% of all personnel in the total DoD and the Navy, 95% of Air Force personnel, and 87% of Army and Marine Corps personnel used seat belts always or nearly always when they drove or rode in an automobile. These overall population rates are all above the *Healthy People 2000* target of use of occupant protection systems by at least 85% of motor vehicle occupants. Consistent with civilian survey data that show the highest rates of seat belt use in States with the most stringent seat belt laws (Siegel et al., 1993), these high rates of seat belt use among military personnel probably reflect regulations requiring personnel to use seat belts when they are driving or riding in motor vehicles on-base. As was discussed in Section 1.6.2, however, comparison of civilian survey data on seat belt use with actual observation of people in motor vehicles suggests that survey respondents may overreport their seat belt use (Siegel et al., 1991). To the extent that military personnel may also tend to overreport their seat belt use, readers are cautioned that these estimates of regular seat belt use among military personnel may overestimate somewhat the percentages of personnel who actually use their seat belts regularly.

Findings from Table 7.10 also indicate that young men aged 20 and under in the total DoD, Army, Navy, and Marine Corps were less likely than other groups to use seat belts regularly. Approximately 76% to 79% of males aged 20 or younger in the total DoD, Army, Navy, and Marine Corps used seat belts always or nearly always. Similarly, the

Table 7.10 Seat Belt Use, by Gender and Age

Gender/Age Group	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Male					
20 or younger	75.8 (3.7)	76.8 (3.3)	78.8 (2.0)	87.7 (2.5)	78.7 (1.8)
21-25	80.0 (2.7)	84.9 (2.0)	84.7 (1.7)	93.0 (0.6)	85.1 (1.2)
26-34	89.5 (2.0)	93.8 (1.2)	94.2 (1.3)	96.2 (0.8)	93.3 (0.8)
35 or older	97.5 (0.5)	96.2 (0.9)	95.9 (0.8)	97.2 (0.6)	96.9 (0.4)
Total	86.1 (2.0)	90.1 (1.2)	87.4 (1.2)	95.0 (0.4)	89.9 (0.8)
Female					
20 or younger	+ (+)	91.5 (2.6)	90.7 (2.6)	97.7 (1.5)	91.7 (2.6)
21-25	91.4 (2.2)	92.8 (1.7)	93.4 (1.7)	97.7 (1.0)	94.1 (1.0)
26-34	95.6 (1.2)	96.3 (1.7)	95.3 (1.3)	97.4 (1.6)	96.4 (0.8)
35 or older	95.9 (1.6)	99.2 (0.5)	92.9 (3.1)	99.7 (0.3)	98.2 (0.6)
Total	93.0 (1.5)	94.9 (1.3)	93.4 (1.3)	98.0 (0.5)	95.3 (0.6)
Total					
20 or younger	77.7 (2.8)	79.7 (3.0)	79.3 (1.9)	90.0 (1.8)	80.8 (1.5)
21-25	81.5 (2.5)	85.8 (1.9)	85.1 (1.7)	93.9 (0.6)	86.2 (1.1)
26-34	90.3 (1.8)	94.0 (1.1)	94.3 (1.3)	96.3 (0.8)	93.7 (0.7)
35 or older	97.3 (0.5)	96.5 (0.8)	95.8 (0.8)	97.6 (0.6)	97.0 (0.4)
Total	87.0 (1.8)	90.6 (1.1)	87.7 (1.2)	95.5 (0.3)	90.6 (0.7)

Note: Table entries are percentages of personnel who reported that they used seat belts "always" or "nearly always" when driving or riding in a car (with standard errors in parentheses). Personnel who reported that they did not drive or ride in a car were excluded from these analyses. Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

lower rates of seat belt use among all personnel aged 20 or younger in the total DoD, Army, Navy, and Marine Corps probably reflect the lower rates of seat belt use among males in this age group. In addition, 80% of males aged 21 to 25 in the Army were regular seat belt users; rates among males aged 21 to 25 in the Navy, Marine Corps, and total DoD were all close to or at the 85% target for the year 2000.

Although these rates indicate that a sizable majority of young males aged 20 or younger were regular seat belt users, the rates for this age group in the total DoD and three of the four Services were below the 85% target set for the year 2000. In contrast, this objective had been met or exceeded for most other age and gender subgroups in the Military. Findings for males aged 26 to 35 and aged 35 and older suggest that younger males who do not use their seat belts regularly may eventually "mature into" the behavior of regular seat belt use. In the meantime, however, the 20% to 25% of young males aged 20 or younger in the total DoD, Army, Navy, and Marine Corps who reported not using seat belts regularly place themselves at increased risk of serious injury or death should they be involved in a serious motor vehicle crash. In addition, as shown in Tables 4.4 and 4.8, males, and particularly young males, were more likely to be heavy alcohol users, and alcohol is commonly involved in motor vehicle fatalities (CDC, 1993c, 1993d). Thus, young military men who do not wear seat belts and who also drink and drive would be further adding to their risk of serious injury or death in a motor vehicle crash. These findings suggest that the DoD and the Services may want to consider additional efforts to encourage seat belt use among young males in order to bring the rates of seat belt use among this group more closely into line with the rates of seat belt use among other groups in the Military and with the *Healthy People 2000* objective.

7.2.3 Helmet Use

Table 7.11 shows the percentages of motorcyclists and bicyclists who wore helmets "always" or "nearly always" when they rode a motorcycle or bicycle in the past 12 months. We based the estimates of helmet use by motorcyclists on those personnel who rode a motorcycle at least once in the past 12 months (unweighted N = 2,890). Similarly, we based the estimates of helmet use by bicyclists on those personnel who rode a bicycle at least once in the past 12 months (unweighted N = 8,937). Personnel who reported that they never rode a motorcycle in the past 12 months or who never rode a bicycle were excluded from these estimates.

Among personnel who rode a motorcycle at least once in the past 12 months, slightly more than 70% wore helmets always or nearly always; the rates for men and women in the total DoD were similar. These overall rates for the Military were somewhat below the *Healthy People 2000* objective of increasing helmet use to at least 80% of motorcyclists. The rate of regular helmet use by Marine Corps women who rode motorcycles in the past 12 months (83.6%) had exceeded this objective. In addition, rates among Air Force men and all Air Force personnel who rode motorcycles were close to this

Table 7.11 Helmet Use Among Motorcyclists and Bicyclists, by Gender, Past 12 Months

Characteristic	*N*	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Males						
Motorcyclists	2,453	69.0 (2.7)	67.4 (2.1)	69.1 (2.7)	78.7 (2.0)	71.0 (1.3)
Bicyclists	7,638	18.3 (3.4)	29.1 (2.8)	18.6 (1.5)	22.8 (3.5)	22.7 (1.8)
Females						
Motorcyclists	437	66.0 (5.4)	73.7 (5.7)	83.6 (3.6)	73.8 (3.8)	71.7 (2.7)
Bicyclists	1,299	20.5 (4.6)	24.4 (2.4)	23.7 (4.9)	25.1 (4.7)	23.4 (2.4)
Total						
Motorcyclists	2,890	68.7 (2.7)	68.0 (2.2)	69.6 (2.5)	78.2 (1.9)	71.0 (1.3)
Bicyclists	8,937	18.6 (3.4)	28.7 (2.6)	18.8 (1.5)	23.1 (3.7)	22.8 (1.8)

Note: Table entries are percentages of personnel who reported wearing helmets "always" or "nearly" always when they rode a motorcycle (with standard errors in parentheses). *N*'s are unweighted counts of respondents who rode a motorcycle or bicycle in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

objective (78.7% and 78.2%, respectively). Thus, except for women in the Marine Corps and all Air Force personnel, the Service-level estimates of regular helmet use by motorcyclists were all near 70%. Taken together, these findings suggest that some additional efforts may be needed to encourage regular helmet use by motorcyclists in the Military.

The unweighted number of respondents who reported riding a bicycle in the past 12 months (8,937 respondents, or more than half of the final sample size of 16,193 respondents) suggests that bicycling may be a popular form of exercise or recreation among a sizable number of military personnel. However, rates of regular helmet use (i.e., helmet use "always" or "nearly always") among military personnel who rode bicycles in the past 12 months were all considerably below the *Healthy People 2000* objective of helmet use by at least 50% of bicyclists. Specifically, about one in five military personnel who rode a bicycle in the past 12 months wore a helmet always or nearly always when they rode. This general pattern held for both men and women and across the Services, although slightly higher percentages of Navy personnel who rode bicycles were regular helmet users. These findings indicate that additional efforts will be needed to encourage helmet use among bicyclists in the Military if the objective of helmet use by at least 50% of bicyclists is to be reached by the year 2000 among military personnel.

7.3 Sexually Transmitted Disease Risk Reduction

Although either abstinence from sexual intercourse or sexual activity within a mutually monogamous relationship is the most effective means of preventing sexually transmitted diseases (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 (CDC, 1988c).

In this section, we present findings on military personnel's STD histories, condom use among sexually active unmarried personnel, and personnel's knowledge and beliefs about AIDS. As part of this discussion, we compare findings on condom use among sexually active unmarried personnel with the following *Healthy People 2000* objective:

- increase to more than 50% the proportion of sexually active, unmarried people who used a condom at last sexual intercourse.

7.3.1 Prevalence of Sexual Activity and Sexually Transmitted Disease

Table 7.12 presents findings on the lifetime prevalence of STDs among military personnel according to the total number of sexual partners they had in their entire lives. For these estimates, we defined a "sexual partner" as someone with whom a person had vaginal or anal intercourse. To estimate the lifetime prevalence of STDs, we asked personnel a "yes/no" question regarding whether they had ever had an STD in their entire lives. To help make it clear for personnel what we meant by "sexually transmitted disease," we also provided the following examples of STDs: gonorrhea, syphilis, chlamydia, or genital herpes. In our examples of STDs, we did not specifically mention such diseases as hepatitis B or HIV/AIDS, for which sexual transmission is a major route of infection, because important routes of nonsexual transmission also exist for these diseases.

As shown in Table 7.12, approximately 20% of all personnel in the total DoD, Army, Marine Corps, and Air Force, and approximately 25% of all personnel in the Navy, had an STD at least once in their lives; rates for military men in the total DoD and the individual Services were comparable to the overall rates. Among military women, the lifetime prevalence of STDs was approximately 25% for women in the total DoD, Navy, Marine Corps, and Air Force, and closer to 30% for women in the Army.

Findings in Table 7.12 also show a clear, direct relationship between a person's lifetime number of sexual partners and the lifetime prevalence of STDs; this relationship held for both military men and women and across the Services. Among personnel in the

Table 7.12 Lifetime Prevalence of Sexually Transmitted Disease, by Gender and Total Number of Partners

Gender/Number of Partners	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Males					
1 person	1.6 (0.7)	1.9 (1.5)	1.7 (1.2)	3.1 (0.9)	2.3 (0.6)
2-4 people	9.0 (1.9)	6.8 (1.1)	7.2 (2.6)	6.9 (0.8)	7.5 (0.8)
5-9 people	11.4 (1.0)	20.1 (2.3)	11.4 (2.3)	15.2 (1.4)	14.9 (0.9)
10 or more people	28.8 (1.6)	35.2 (1.7)	28.8 (1.8)	31.0 (1.3)	31.3 (0.8)
Total	19.9 (0.8)	24.9 (1.1)	20.0 (1.6)	19.1 (1.1)	21.1 (0.6)
Females					
1 person	4.9 (3.7)	3.4 (2.5)	12.1 (5.0)	+ (+)	2.7 (1.2)
2-4 people	13.9 (2.7)	12.4 (3.4)	14.3 (3.6)	10.4 (2.1)	12.3 (1.5)
5-9 people	30.6 (3.9)	20.9 (2.8)	24.7 (4.0)	25.1 (2.1)	26.1 (1.9)
10 or more people	38.8 (1.5)	40.6 (3.1)	36.6 (3.0)	38.6 (2.6)	39.2 (1.4)
Total	27.8 (1.9)	26.2 (1.6)	26.2 (2.3)	24.8 (1.3)	26.2 (0.9)
Total					
1 person	2.0 (0.7)	2.1 (1.3)	2.4 (1.2)	2.8 (0.8)	2.4 (0.5)
2-4 people	10.0 (1.6)	7.5 (1.0)	7.7 (2.5)	7.5 (0.9)	8.3 (0.7)
5-9 people	14.8 (1.3)	20.2 (2.0)	12.2 (2.3)	16.9 (1.4)	16.6 (0.9)
10 or more people	29.6 (1.5)	35.7 (1.4)	29.0 (1.7)	32.0 (1.1)	32.0 (0.8)
Total	20.9 (0.8)	25.1 (1.0)	20.3 (1.6)	20.0 (0.9)	21.8 (0.5)

Note: Table entries are percentages who had ever had a sexually transmitted disease (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

total DoD who had 10 or more sexual partners in their entire lives, nearly one-third (32.0%) had one or more STDs. In comparison, approximately 17% of personnel who had five to nine partners had ever had an STD, as had 8% of personnel who had two to four partners. Among personnel who had only one partner in their entire lives, only about 2% had ever had an STD.

Although these findings suggest that personnel who have had only one sexual partner in their entire lives have a very low risk for getting an STD but are not totally free of risk (e.g., if their partner has had other partners), readers are cautioned that we did not ask personnel about the number of partners with whom they had oral intercourse. If the questionnaire had included a question on this sexual behavior, then some of these personnel who reported only one partner in their lifetimes and who also reported having had an STD may actually have had multiple partners. Nevertheless, the data from Table 7.12 make clear an important point: The more sexual partners that a person has, the greater a person's risk of getting an STD.

7.3.2 Condom Use

Table 7.13 presents findings on correlates of condom use among sexually active unmarried personnel in the Military. For these estimates, we defined "sexually active" personnel as those who had vaginal or anal intercourse in the 12 months prior to the survey.[2]

Approximately 40% of unmarried personnel in the total DoD and the Services who were sexually active in the past 12 months used a condom the last time they had intercourse. These rates were all lower than the *Healthy People 2000* objective of condom use at the last episode of sexual intercourse by at least 50% of sexually active unmarried individuals, with the Navy and Marine Corps being somewhat closer to the objective.

In comparison, approximately 50% of unmarried personnel in 1992 who had *ever* been sexually active used a condom the last time they had sex (Bray et al., 1992). However, readers should not conclude from comparison of the findings in 1992 with those in Table 7.13 that the Military has not shown progress in any efforts to encourage condom use among sexually active unmarried personnel. In particular, the measure of condom use among sexually active unmarried personnel in 1992 is not strictly comparable with the measure used in Table 7.13. As noted above, the 1992 estimates of condom use were

---

[2]As noted above, we did not include oral intercourse in our measure of respondents being "sexually active." A total of 497 out of 5,425 unmarried survey respondents who answered the question on recency of sexual activity indicated that they had not had sex in the past 12 months. Some of these respondents could have had oral intercourse in the past 12 months. However, it is unlikely that most of these respondents who reported no sexual activity in the past 12 months would have had oral intercourse exclusively.

Table 7.13 Condom Use at Last Encounter Among Sexually Active Unmarried Personnel, by Selected Sociodemographic Characteristics

Characteristic/ Group	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
All Sexually Active Unmarried Personnel[a]	37.1	(1.9)	42.9	(1.8)	42.7	(1.8)	40.5	(1.1)	40.4	(1.0)
Sex										
Male	38.0	(2.4)	44.9	(1.4)	43.3	(1.9)	43.1	(1.5)	41.9	(1.1)
Female	32.7	(4.0)	31.3	(4.1)	30.4	(2.9)	30.5	(2.0)	31.5	(2.0)
Age										
20 or younger	42.4	(4.3)	43.5	(3.8)	42.7	(2.9)	45.9	(2.9)	43.3	(2.1)
21-25	37.4	(3.2)	46.5	(2.6)	44.8	(1.9)	41.9	(1.5)	42.1	(1.5)
26-34	35.0	(4.0)	40.7	(3.9)	39.8	(4.0)	37.9	(3.5)	37.9	(2.1)
35 or older	23.4	(3.7)	29.8	(3.7)	30.9	(4.5)	32.8	(4.2)	28.9	(2.2)
Education										
High school or less	38.0	(3.1)	39.6	(1.6)	43.3	(2.4)	44.1	(1.6)	40.4	(1.4)
Some college	36.5	(2.9)	49.1	(2.9)	41.7	(4.2)	39.3	(1.7)	41.1	(1.5)
College graduate	35.5	(3.0)	38.7	(5.1)	42.0	(2.3)	37.4	(3.9)	37.5	(2.1)
Pay Grade										
Enlisted	37.4	(2.1)	43.4	(1.8)	43.2	(1.9)	41.0	(0.9)	40.8	(1.0)
Officer	34.1	(4.7)	37.4	(4.3)	34.0	(2.1)	37.2	(4.2)	36.0	(2.3)
Number of Partners, Past 12 Months										
1 partner	34.3	(2.5)	36.5	(1.9)	39.4	(3.9)	39.6	(2.6)	37.0	(1.3)
2-4 partners	38.1	(2.8)	47.9	(3.2)	44.2	(2.4)	39.8	(1.9)	42.3	(1.5)
5 or more partners	39.3	(4.1)	44.0	(3.3)	43.8	(2.3)	44.3	(3.1)	42.1	(2.0)

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

[a]Defined as unmarried personnel who had one or more sexual partners in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

based on personnel who had a lifetime history of being sexually active, regardless of when they last had sex. In contrast, the estimates in Table 7.13 focus on personnel who were sexually active in the more recent past.

Additional key findings about correlates of condom use among sexually active unmarried personnel in 1995 include the following:

- 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.

- Younger unmarried personnel were more likely than older personnel to have used a condom the last time they had sex. Except for sexually active unmarried Army personnel aged 21 to 25, more than 40% of sexually active unmarried personnel aged 25 and younger used a condom the last time they had sex. In comparison, only 23% to 33% of sexually active unmarried personnel who were 35 or older used a condom during their last sexual encounter.

- Differences in condom use by education and enlisted/officer status were less apparent. Although sexually active unmarried officers appeared to have somewhat lower rates of condom use the last time they had sex, the estimates for this group were less precise than the estimates for sexually active unmarried enlisted personnel.

- Except for the Air Force, personnel who had more than one sexual partner in the past 12 months were somewhat more likely to have used a condom than were personnel who had only one partner. However, this relationship was not a particularly strong one, given the size of the standard errors of the estimates, especially for personnel who had five or more partners in the past 12 months.

The 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 sexually active 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 STD infection, including infection with HIV.

In addition, the lack of a strong relationship between condom use at last encounter among personnel who had multiple partners in the past 12 months is a particular issue of concern. As was discussed above, the more sexual partners that a person has had, the greater the risk of getting an STD (Table 7.12). Although the incidence of HIV infection and seroconversion in the HIV antibody test is low among military personnel (Burrelli, 1992; Levin et al., 1995; McNeil et al., 1991), personnel who have multiple partners but who use condoms inconsistently (or not at all) are still at increased risk for infection with

other STDs, such as gonorrhea or chlamydia. Yankauer (1994) expressed concern that the attention (and funding) being given to AIDS education and research could negatively affect efforts to prevent and treat other STDs.

Although data on sexually active unmarried personnel who did not use a condom the last time they had sex provides some indication of inconsistent use of condoms, the 1995 DoD survey questionnaire also included a question about the frequency with which personnel used condoms when they had sex in the past 12 months. Table 7.14 presents findings for the total DoD population comparing the frequency of condom use among sexually active unmarried personnel in the past 12 months with the number of sexual partners that these personnel had in the past 12 months.

Table 7.14 Frequency of Condom Use Among Sexually Active Unmarried Personnel, by Number of Sexual Partners, Past 12 Months, Total DoD

	Number of Partners, Past 12 Months			
Condom Use, Past 12 Months[a]	**1 or more people**	**1 person**	**2 to 4 people**	**5 or more people**
Every time or most of the time	44.8 (1.0)	38.8 (1.5)	47.8 (1.3)	48.6 (1.8)
Half of the time or less[b]	28.3 (0.9)	19.6 (1.1)	30.5 (1.3)	37.7 (2.0)
Never	26.9 (0.9)	41.6 (1.5)	21.6 (1.3)	13.7 (1.5)

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

[a]Based on reported condom use by the respondent or the respondent's partner.

[b]Used condoms "about half of the time," "some of the time," or "hardly any of the time" in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Overall, about 45% of sexually active unmarried military personnel used condoms every time or most of the time when they had sex in the past 12 months, and the majority (55%) used condoms half of the time or less often, including 27% who never used a condom when they had sex. As might be expected, a sizable proportion of sexually active unmarried personnel who had only one sexual partner in the past 12 months never used a condom when they had sex in the past 12 months (42%). As long as both partners are monogamous, however, the risk of STD infection is virtually nonexistent.

Among unmarried personnel who had two to four sexual partners or five or more partners in the past 12 months, slightly less than half used condoms every time or most of the time when they had sex in the past 12 months. On the one hand, these findings may be seen as encouraging, in that they indicate that a substantial proportion of sexually

active unmarried personnel who had multiple partners in the past 12 months were reducing their risk of STD infection through fairly consistent use of condoms. On the other hand, these findings are cause for concern, in that they indicate that half of unmarried military personnel who had multiple partners were very inconsistent in their use of condoms, if they used condoms at all. Moreover, approximately one in five sexually active unmarried personnel who had two to four partners in the past 12 months and approximately 14% of sexually active unmarried personnel who had five or more partners during this time period never used condoms when they had sex. Not only are these personnel at increased risk for STD infection because they had sex with multiple partners, but these findings also suggest that those personnel who had multiple partners and never used condoms when having sex had done little if anything to reduce their risk.

7.3.3 Knowledge and Beliefs About AIDS

Because the consequences of infection with HIV 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 set of five true-false questions directed at the methods of transmission, symptoms (or lack thereof), and treatment of the disease. These questions were adapted from the NHIS.

Table 7.15 presents the proportion responding correctly to each of the questions, with footnotes indicating the correct response. Taken together, most of the findings from Table 7.15 indicate a high level of knowledge about transmission, the asymptomatic nature of HIV infection in the early stages of infection, and the unavailability of a cure for AIDS. In particular, virtually all personnel (nearly 99%) were aware that HIV could be sexually transmitted between a man and a woman. This finding suggests that personnel who engage in unprotected heterosexual intercourse with multiple partners might have an intellectual awareness of their increased risk for infection with HIV and other STDs. However, findings from Table 7.14 on infrequent condom use or no condom use among unmarried personnel with multiple partners indicates that for a sizable percentage of at-risk personnel, this knowledge has not translated into appropriate behavior to reduce their risk.

There was also a high level of awareness that people with the AIDS virus can look and feel healthy (96.6%). This information is important in that military personnel need to know that protective measures should be taken with any sexual partner. Just because a potential sexual partner looks healthy does not mean that this person is not infected with HIV. Infected persons can live for years without experiencing any symptoms and may not even know they are infected. Therefore, every new sexual partner must be viewed as a potentially risky partner.

Table 7.15 General Knowledge About AIDS, by Service

Knowledge Item	Service				Total DoD
	Army	Navy	Marine Corps	Air Force	
AIDS virus can be transmitted by sexual intercourse between a man and a woman[a]	98.6 (0.2)	98.6 (0.2)	98.5 (0.3)	98.9 (0.2)	98.7 (0.1)
Person with the AIDS virus can look healthy[a]	96.7 (0.4)	95.7 (0.5)	96.4 (0.4)	97.7 (0.2)	96.6 (0.2)
Vaccine available against AIDS[b]	89.2 (1.2)	88.1 (1.0)	88.5 (0.6)	90.8 (0.5)	89.2 (0.5)
No cure for AIDS at present[a]	90.4 (0.9)	89.8 (0.5)	90.7 (0.6)	91.9 (0.6)	90.7 (0.4)
Natural-membrane and latex condoms equally effective against AIDS virus transmission[b]	54.5 (1.5)	59.6 (1.9)	57.0 (1.2)	55.0 (1.0)	56.4 (0.8)

Note: Table values are percentages of personnel 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: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Most military personnel were aware that presently there is no cure for AIDS (90.7%). This is a key piece of information, in that individuals need to focus on preventing themselves from getting infected in the first place; once a person is infected, drugs can reduce symptoms and extend a person's life, but the person cannot be cured. Similarly, approximately 90% of personnel correctly knew that there is no vaccine available against AIDS. Conversely, however, some 10% either believed incorrectly that there is a vaccine available, or else they did not know that a vaccine is not available.

The biggest gap is in knowledge related to preventive measures. Approximately 55% to 60% of personnel in the total DoD and the Services correctly knew that natural-membrane and latex condoms are not equally effective against the AIDS virus. Conversely, then, nearly 40% to 45% of personnel were not aware of the difference in effectiveness between these two types of condoms. However, these rates in 1995 represent an improvement from the rates in 1992, when less than half of all military personnel (42.5%) knew that natural-membrane and latex condoms are not equally effective against the AIDS virus (Bray et al., 1992). Furthermore, these gaps are not unique to military personnel; results from the 1992 NHIS indicate that only 27% of civilian adults correctly knew that these two types of condoms were not equally effective in preventing HIV transmission, and more than half (55%) did not know whether there was a difference (Schoenborn, Marsh, & Hardy, 1994).

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 included 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 7.16).

Table 7.16 Beliefs About How AIDS Is Transmitted, by Service

	Service				
Items	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Working with someone with AIDS virus	12.9 (1.1)	11.0 (0.7)	11.0 (0.4)	11.1 (0.7)	11.6 (0.4)
Eating in dining facility where cook has AIDS virus	28.5 (1.3)	25.2 (1.1)	28.8 (1.2)	28.0 (1.0)	27.4 (0.6)
Sharing eating utensils with someone with AIDS virus	27.4 (1.1)	24.6 (1.5)	25.1 (1.2)	30.6 (1.1)	27.2 (0.7)
Using public toilets	13.8 (0.8)	12.0 (1.0)	13.7 (0.4)	14.2 (0.8)	13.4 (0.5)
Coughing or sneezing	20.7 (0.9)	19.8 (1.3)	19.7 (1.0)	25.1 (1.0)	21.6 (0.6)
Mosquitoes or other insects	25.6 (1.1)	25.5 (1.2)	25.8 (1.0)	26.3 (1.3)	25.8 (0.6)
Being cared for by health care worker with AIDS virus	47.8 (1.0)	41.3 (2.0)	46.3 (1.4)	45.9 (1.1)	45.2 (0.8)
Getting blood transfusion	62.6 (1.1)	59.7 (1.5)	61.3 (1.6)	61.5 (1.3)	61.3 (0.7)

Note: Table values are percentages (with standard errors in parentheses). Data are percentages of personnel 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: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Approximately 60% of all military personnel thought that HIV infection was "very likely" or "somewhat likely" through blood transfusions, and approximately 45% thought that being cared for by a health worker who was infected with HIV was a likely route of infection. Although the blood supply has been safe since 1985 when regular testing of donations began, transmission by this route has occurred in the past. Technically, it is possible to become infected through a blood transfusion, but with universal testing of the blood supply, the possibility is extremely remote.

As noted in the previous paragraph, approximately 45% of military personnel thought that being cared for by an infected health care worker was a possible source of infection. In the past 5 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 infected workers. Even though the possibility of becoming infected through this mechanism is extremely remote and few if any cases of HIV infection from an infected health care worker have been documented, transmission through health care worker contact was seen as a real possibility across all Services.

There was also a significant amount of misconception about the risks of casual contact. More than a quarter of all military personnel in 1995 believed that eating in a dining facility where the cook was infected (27.4%), or by sharing eating utensils with someone who was HIV-positive (27.2%) were likely routes of infection. These rates were similar to those in 1992, when approximately 26% believed that HIV infection was likely through these two routes (Bray et al., 1992). Similarly, about 20% of personnel in 1995 thought that being coughed at or sneezed on by someone with the virus posed a risk, a rate similar to the 23% in 1992. Personnel in 1995 expressed less concern about transmission from working with someone who was infected (11.6%) or using public toilets (13.4%). However, the percentage of personnel in 1995 who believed that working with someone who was infected was a likely route of transmission was a slight increase from the rate of 9.7% in 1992.

DoD policy states that HIV infection alone may not be the basis for forcibly separating anyone from the Services (DoD, 1991a). As in 1992, 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 in 1995 (25.8%) incorrectly believed that mosquitoes or other insects are a possible method of transmission. However, this rate in 1995 represents a slight decrease from the rate in

1992, when 27.8% of personnel thought that mosquitoes or other insects could transmit HIV (Bray et al., 1992).

In summary, the vast majority of military personnel recognized the risks of HIV infection through sexual contact. 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.

In addition, comparison of findings from Tables 7.14 and 7.15 indicates that sizable percentages of unmarried personnel who had sex with multiple partners used condoms inconsistently, if at all, despite generally high levels of awareness that HIV could be transmitted through heterosexual intercourse. On the one hand, these findings suggest that health education efforts in the Military (or in the broader civilian population) have generally been effective in making personnel aware that HIV can be transmitted sexually between a man and a woman. However, this awareness has not necessarily translated into appropriate risk-reducing *behaviors* among some potentially high-risk groups of personnel. These findings suggest that an important focus of future health education efforts needs to be on identifying effective ways to encourage high-risk personnel to reduce their risk of STD infection through reductions in their numbers of sexual partners, consistent use of condoms, or both. Additional research may also help explain why some military personnel who have multiple sexual partners use condoms inconsistently, or not at all.

7.4 Summary

In keeping with the 1995 DoD survey's aim of developing baseline estimates to measure progress toward a variety of *Healthy People 2000* objectives, the survey contained items on cardiovascular disease risk reduction, injuries and injury prevention, and sexually transmitted disease (STD) risk reduction, including knowledge and beliefs about the acquired immune deficiency syndrome (AIDS).

7.4.1 Cardiovascular Disease Risk Reduction

The 1995 DoD survey contained questions pertaining to the following elements of cardiovascular disease risk and risk reduction: overweight, exercise, high blood pressure screening and control, and cholesterol screening.

7.4.1.1 Overweight and Exercise

- Among people under the age of 20, the Military in 1995 had reached the *Healthy People 2000* objective of reducing the prevalence of overweight to no more than 15% only among women. However, readers are cautioned that the Body Mass Index (BMI) may overestimate the prevalence of overweight somewhat among military personnel.

- The Military had reached the *Healthy People 2000* objective related to reducing the prevalence of overweight among people aged 20 or older to no more than 20% among personnel aged 20 to 25 and for most groups among personnel aged 26 to 34 (Table 7.1). Exceptions were Navy personnel aged 26 to 34 as a whole (22.9%) and Navy men aged 26 to 34 (24.1%).

- Among personnel aged 35 or older, the *Healthy People 2000* objective pertaining to overweight among people aged 20 or older had been met by all Army and Marine Corps personnel, by men in the Army and Marine Corps, and among women in the total DoD and all four Services (Table 7.1).

- Nearly two-thirds of all personnel in the total DoD, approximately 80% of personnel in the Army and Marine Corps, and 50% to 58% of Navy and Air Force personnel engaged in strenuous exercise at least 3 days per week for 20 minutes or more per occasion in the past 30 days (Table 7.2). Thus, the Military in 1995 continued to greatly exceed 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.

- For the total DoD, involvement in strenuous physical exercise varied little by gender or pay grade (Table 7.3).

7.4.1.2 High Blood Pressure

- About 75% of personnel in the total DoD, Army, and Navy; about 80% of Air Force personnel; and about 70% of Marine Corps personnel had their blood pressure checked in the past 2 years and could state the result (Table 7.4). These rates were all somewhat lower than the *Healthy People 2000* target of 90% of adults having their blood pressure checked in the past 2 years and being able to state whether it was normal or high.

- Personnel with no education beyond high school were less likely than personnel with a 4-year college degree or greater to have had their blood pressure checked in the past 2 years and to be able to state the result (Table 7.4). Similarly, rates of blood pressure screening in the past 2 years and awareness of the results were lower among personnel aged 20 or younger compared with personnel aged 35 or older.

- Altogether, an estimated 12.8% of all active-duty military personnel, or approximately one in eight, had a history of high blood pressure (Table 7.5). Military men were more likely than military women to

have a history of high blood pressure. Similarly, blacks were more likely than members of other racial/ethnic groups to have a history of high blood pressure.

- Approximately two-thirds (64.7%) of military personnel who had a history of high blood pressure had been given a prescription for high blood pressure medication or had been advised to diet to lose weight, cut down on salt in their diet, or exercise as means of controlling their high blood pressure (Table 7.6). Common forms of medical advice given to military personnel with a history of high blood pressure included exercise (48.9%) and reductions in salt intake (48.2%). Only about one in five personnel with a history of high blood pressure (21.3%) were prescribed antihypertensive medication.

- Slightly less than half of active-duty personnel who had a lifetime history of high blood pressure were taking one or more of the above recommended actions to control their high blood pressure (Table 7.6). This estimate was considerably lower than the *Healthy People 2000* objective of increasing to at least 90% the proportion of people with high blood pressure who are taking action to control their blood pressure.

- Among personnel who had a history of high blood pressure and whose most recent blood pressure result in the past 2 years was high, 61% were currently taking one or more of these actions (Table 7.6). This rate was still well below the target of 90% set for the year 2000.

7.4.1.3 Cholesterol

- The *Healthy People 2000* objective of at least 75% of adults having their cholesterol checked in the past 5 years had been reached among personnel aged 25 to 49 in the Army (78.5%) and Air Force (78.7%) (Table 7.7), and among personnel aged 50 or older in the total DoD (95.2%) and Navy (89.5%). In addition, 85.2% of Army personnel and 84.8% of Air Force personnel aged 50 or older had their cholesterol checked in the past 2 years, rates that were also above the target of 75% by the year 2000.

- Approximately 18% of all active-duty personnel and of military men and 15% of military women had a history of elevated serum cholesterol (Table 7.8). Rates of elevated cholesterol were higher among older personnel than among younger personnel, but this finding is probably related to lower rates of cholesterol screening among younger personnel (Table 7.7).

7.4.2 Injuries and Injury Prevention

The 1995 DoD survey contained questions pertaining to overnight hospitalizations in the past 12 months for treatment of injuries, as well as questions on the following behaviors that are designed to reduce the risk of injury: seat belt use by drivers and riders in automobiles and helmet use by motorcyclists and bicyclists.

7.4.2.1 Prevalence of Injuries

- In 1995, approximately 3,400 personnel per 100,000 active-duty personnel had been hospitalized in the past 12 months for treatment of an injury (Table 7.9). This rate was considerably higher than the *Healthy People 2000* objective of reducing injuries requiring hospitalization to no more than 754 per 100,000 people. Rates for the individual Services were also well above this targeted rate for the year 2000.

7.4.2.2 Seat Belt Use

- Approximately 90% of all active-duty personnel and Navy personnel, 95% of Air Force personnel, and 87% of Army and Marine Corps personnel used seat belts always or nearly always when driving or riding in an automobile (Table 7.10). These rates were all above the *Healthy People 2000* objective of increasing use of occupant protection systems to at least 85% of motor vehicle occupants. However, comparison of civilian survey data with actual observation of motor vehicle occupants suggests that some overreporting of seat belt use could be occurring.

- Except for the Air Force, about 75% to 80% of young military men aged 20 or younger in the total DoD and the individual Services were regular seat belt users. These rates were all below the 85% target set for the year 2000 (Table 7.10). However, nearly 90% of Air Force men aged 20 or younger were regular seat belt users, a rate that was above the objective for the year 2000.

7.4.2.3 Helmet Use

- Among active-duty personnel who rode motorcycles in the past 12 months, approximately 70% wore helmets always or nearly always (Table 7.11). This rate was somewhat lower than the *Healthy People 2000* objective of increasing helmet use to at least 80% of motorcyclists. However, this objective had been reached among women in the Marine Corps who rode motorcycles in the past 12 months (83.6%).

- Rates of regular helmet use (i.e., always or nearly always) among personnel who rode bicycles in the past 12 months were all considerably below the *Healthy People 2000* objective of helmet use by at least 50% of bicyclists (Table 7.11). About one in five personnel (22.8%) who rode a bicycle in the past 12 months wore a helmet when they rode.

7.4.3 Sexually Transmitted Disease Risk Reduction

Abstinence from sexual intercourse or sexual activity within a mutually monogamous relationship are the most effective means of preventing sexually transmitted diseases (STDs), including AIDS. However, personnel who are sexually active but not in a mutually monogamous relationship can reduce their risk of infection with STDs through

consistent and proper use of condoms. The 1995 DoD survey included questions about military personnel's STD histories, STD risk behaviors, condom use among sexually active unmarried personnel, and personnel's knowledge and beliefs about AIDS.

7.4.3.1 Prevalence of Sexual Activity and Sexually Transmitted Disease

- Approximately 20% of all personnel in the total DoD, Army, Marine Corps, and Air Force, and approximately 25% of all Navy personnel, had a lifetime history of one or more STDs (Table 7.12).

- The more sexual partners that a person had in his or her lifetime, the greater the likelihood of having had an STD. Nearly one-third (32%) of personnel who had 10 or more sexual partners in their lifetimes had a history of an STD, compared with 17% of personnel who had five to nine partners, 8% of personnel who had two to four partners, and 2% of personnel who had only one partner (Table 7.12).

7.4.3.2 Condom Use

- Approximately 40% of unmarried personnel in the total DoD and the Services who were sexually active in the past 12 months used a condom the last time they had intercourse (Table 7.13). These rates were all lower than the *Healthy People 2000* objective of condom use at the last episode of sexual intercourse by at least 50% of sexually active unmarried people.

- Sexually active unmarried men were more likely to have used a condom the last time they had sex than were the partners of sexually active unmarried women (Table 7.13). Younger unmarried personnel were more likely than older unmarried personnel aged 35 or older to have used a condom the last time they had sex. There was little relationship between the number of partners that a person had in the past 12 months and whether that person (or the sexual partner) used a condom during the last sexual encounter.

- Approximately half of sexually active unmarried personnel who had two to four partners or five or more partners in the past 12 months used condoms every time or most of the time when they had sex (Table 7.14). Conversely, however, approximately half of these personnel who had multiple partners used condoms inconsistently. Furthermore, approximately one in five unmarried personnel who had two to four partners in the past 12 months and 14% of unmarried personnel who have five or more partners *never* used a condom when they had sex.

7.4.3.3 Knowledge and Beliefs About AIDS

- Findings from the 1995 DoD survey suggest a generally high level of knowledge among military personnel about the means of transmission of the human immunodeficiency virus (HIV), AIDS symptoms, and treatment of the disease (Table 7.15). In particular, virtually all personnel (nearly 99%) were aware that HIV could be transmitted sexually between a man and a woman. As discussed above, however, this knowledge had apparently not translated into

appropriate risk-reducing behaviors for personnel who had multiple sexual partners but who used condoms inconsistently or not at all (Table 7.14).

- The biggest gap in knowledge about HIV and AIDS was related to preventive measures. Approximately 55% to 60% of personnel in the total DoD and the Services correctly knew that latex condoms and natural-membrane condoms are not equally effective against transmission of HIV (Table 7.15). However, this knowledge gap is not unique to military personnel.

- Nearly half (45%) of military personnel incorrectly believed that being cared for by an infected health care worker is likely to result in transmission of HIV (Table 7.16).

- Sizable percentages of personnel incorrectly believed that HIV can be transmitted through casual contact such as sharing eating utensils with an infected person (27.2%), eating in a dining facility where the cook is infected (27.4%), or through coughing or sneezing (21.6%). In addition, about one in four personnel (25.8%) incorrectly believed that HIV could be transmitted through mosquitoes or other insects (Table 7.16).

Taken together, these findings in Chapter 7 indicate that the Military in 1995 had met the *Healthy People 2000* objective for exercise, and many segments of the military population had met the objective for overweight. However, the estimates of overweight among all personnel aged 20 or younger and men in this age group were above the relevant *Healthy People 2000* objective.

The total DoD and some of the Services had also met the objective for cholesterol screening in the past 5 years among personnel in some age groups. As discussed previously, given the emphasis on fitness and readiness in the Military, and the access to preventive medical services, it is not surprising that these objectives have already been reached for the Military as a whole or among some segments of the military population.

In addition, rates of regular seat belt use suggest that the most segments of the military population in 1995 had met the *Healthy People 2000* objective related to use of occupant protection systems by motor vehicle occupants. Military regulations mandating that personnel wear their seat belts when on-base is probably an important contributor to high rates of regular seat belt use among military personnel.

Findings from the 1995 DoD survey also suggest that additional effort will be needed to meet *Healthy People 2000* objectives in the areas of

- blood pressure screening and awareness;

- actions taken to control high blood pressure among personnel with a history of high blood pressure;

- the occurrence of injuries that require hospitalization;
- helmet use among motorcyclists and bicyclists; and
- condom use among sexually active unmarried personnel.

However, findings from the 1995 DoD survey suggest that the rates of blood pressure screening and awareness that were below the *Healthy People 2000* objective of 90% were likely due to some personnel having limited ability to recall when they last had their blood pressure checked, or what the result was, particularly among younger or less educated personnel.

The estimates presented in this chapter related to specific *Healthy People 2000* objectives were designed to provide a baseline against which to compare rates in subsequent survey years. In particular, the fact that the Military met a given objective in 1995 does not necessarily guarantee that it will continue to meet that same objective in later years because of the turnover in personnel. In addition, for those objectives where 1995 DoD survey findings indicate that further effort is needed, estimates from subsequent surveys will help gauge whether progress has been made toward meeting these objectives.

8. MENTAL HEALTH, STRESS, AND COPING

The 1995 DoD survey contained a set of questions about the mental health of active-duty personnel. As in the 1988 and 1992 surveys (Bray et al., 1988, 1992), the 1995 survey asked respondents to appraise their levels of stress at work and in their intimate and family relationships. For the first time in the series, respondents also provided information on specific sources of stress and on the perceived impact of work-related, family, and interpersonal stress on their military performance. We also asked respondents to specify the methods that they used to cope with stress. In addition, we collected information on indicators of depressive symptoms for different time frames and examined relationships among stress, depression, and alcohol use. In this chapter, we present findings related to the issues of mental health, exposure to stress, coping strategies, and functioning.

8.1 Appraisal of Stress

Psychosocial theories of stress generally recognize the importance of cognitive factors in the development and maintenance of stress-related symptoms and problems in life functioning. Folkman and Lazarus (1980, 1985), for example, proposed a psychosocial model that emphasizes the important role that appraisal plays in the development and maintenance of stress-related adjustment problems. Indeed, a number of experimental and applied studies have shown robust relationships between individuals' appraisal of the level of stress associated with specific life events and their capacity to function effectively (cf. Foa, Steketee, & Olasov Rothbaum, 1989).

We asked military personnel to appraise separately the levels of stress that they experience at work and in their personal relationships and family life. Participants were asked the following questions:

- During the past 12 months, how much stress did you experience at work or while carrying out your military duties?
- 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?

The findings in Table 8.1 show distributions across response categories indicating that personnel in each Service were more likely to describe their military duties as stressful than their family or personal lives. Among the total DoD, 39.3% perceived high levels of stress at work (i.e., a "great deal" or a "fairly large amount"). In contrast, 22.4% perceived high levels of stress in their personal relationships. Twice as many military personnel apparently perceived no stress associated with their personal relationships (20.3%) compared with personnel who perceived no stress at work (10.0%). We found

Table 8.1 Levels of Perceived Stress at Work and in Family Life, Past 12 Months

Type of Stress/ Level	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Stress at Work					
Great deal	17.0 (1.1)	17.8 (1.3)	17.5 (1.0)	12.3 (1.1)	16.0 (0.6)
Fairly large amount	22.9 (0.9)	24.0 (1.1)	23.2 (1.0)	23.1 (0.6)	23.3 (0.5)
Some	29.3 (1.1)	27.4 (0.7)	29.7 (1.3)	33.0 (0.9)	29.8 (0.5)
A little	20.9 (0.8)	20.4 (1.6)	18.9 (0.8)	22.0 (1.0)	20.9 (0.6)
None	9.9 (0.7)	10.4 (0.7)	10.7 (1.2)	9.6 (0.6)	10.0 (0.4)
Stress in Family					
Great deal	9.4 (0.7)	9.8 (0.5)	10.6 (1.0)	8.3 (0.5)	9.3 (0.3)
Fairly large amount	12.8 (0.6)	13.7 (0.5)	12.2 (0.5)	13.0 (0.7)	13.1 (0.3)
Some	26.7 (1.0)	26.8 (0.9)	25.4 (1.2)	28.7 (0.6)	27.2 (0.5)
A little	30.8 (1.0)	28.1 (0.7)	29.4 (1.0)	31.7 (1.0)	30.1 (0.5)
None	20.2 (0.6)	21.6 (0.7)	22.4 (1.0)	18.2 (0.7)	20.3 (0.4)

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

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

similar trends for each Service, with Army, Navy, Marine Corps, and Air Force personnel all indicating higher levels of stress associated with work than with their personal and family relationships. In addition, Army, Navy, and Marine Corps personnel were somewhat more likely than Air Force personnel to indicate a great deal of stress at work.

8.2 Specific Sources of Stress

We attempted to enhance our understanding of the nature of perceived stress through the following specific question on potential sources of stress in the domains of work and family life: During the past 12 months, how much stress did you experience from each of the following?

- being deployed at sea or in the field;
- having a permanent change of station (PCS);
- problems in your relationships with the people you work with;
- problems in your relationship with your immediate supervisor(s);
- concern about being separated from the Military;
- increases in your work load;
- being away from your family;

- changes in your family, such as the birth of a baby, a divorce, or a death in the family;
- conflicts between your military and family responsibilities;
- problems with money;
- problems with housing;
- health problems that you had;
- and health problems in your family.

Table 8.2 presents the responses to this question for men and women. It shows that, for men, the most frequently mentioned sources of stress were being away from family (23.7%), deployment (17.1%), increases in work load (16.6%), financial problems (15.0%), and conflicts between military and family responsibilities (13.0%). For women, the most frequently mentioned sources of stress were being away from family (21.1%); major changes in family, such as birth or death of a loved one (17.0%); increases in work load (15.9%); problems in work relationships (15.7%); and problems with supervisors (13.1%).

Table 8.2 Specific Sources of Stress, Past 12 Months, by Gender, Total DoD

	Gender		
Stressor	**Men**	**Women**	**Total DoD**
Deployment	17.1 (1.3)	6.9 (1.2)	15.9 (1.3)
Having a PCS[a]	10.0 (0.4)	12.2 (0.9)	10.3 (0.4)
Work relationships	12.4 (0.7)	15.7 (1.0)	12.8 (0.6)
Problems with supervisor	12.4 (0.6)	13.1 (1.0)	12.5 (0.6)
Concern about separation from the Military	8.7 (0.3)	7.1 (0.6)	8.5 (0.3)
Increases in work load	16.6 (0.6)	15.9 (1.0)	16.5 (0.6)
Being away from family	23.7 (1.5)	21.1 (1.2)	23.4 (1.4)
Changes in family	12.3 (0.4)	17.0 (0.7)	12.8 (0.3)
Conflicts between military and family responsibilities	13.0 (0.6)	12.8 (0.7)	13.0 (0.6)
Financial problems	15.0 (0.6)	12.2 (0.8)	14.6 (0.6)
Housing problems	7.6 (0.5)	7.5 (0.8)	7.6 (0.5)
Personal health problems	4.0 (0.2)	8.6 (0.6)	4.6 (0.2)
Family health problems	7.4 (0.3)	9.1 (0.6)	7.6 (0.3)

Note: Table entries are percentages of personnel who reported "a great deal" or a "fairly large amount" of stress in the past 12 months (with standard errors in parentheses).

[a]PCS = Permanent change of station.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Overall, the percentages of men and women who identified the different specific problems as significant sources of stress were quite comparable. For example, Table 8.2 shows that housing problems were a major stressor for 7.6% of men and 7.5% of women, and 15% of men and 12.2% of women experienced considerable stress due to financial problems. Some 10.0% of men and 12.2% of women indicated a PCS as a significant stressor, and 8.7% of men and 7.1% of women reported concerns about separation from the Military. Increases in work load were highly stressful for 16.6% of men compared with 15.9% of women. Some 13.0% of men and 12.8% of women found conflicts between military and family responsibilities to be a significant source of stress. About one in eight men (12.4%) and 13.1% of women found their relationships with their immediate supervisors to be highly stressful, and problems in relationships with co-workers were highly stressful for 12.4% of men and 15.7% of women.

In spite of an overall trend for similar proportions of men and women to appraise specific circumstances at work and in their personal lives as highly stressful, there nonetheless appeared to be substantial variability by gender for several types of circumstances. Related to their military functioning, more men than women (17.1% vs. 6.9%) perceived deployment at sea or in the field to be a significant stressor. Women were more likely to indicate that major changes in family structure and functioning, such as the birth of a baby, a divorce, or a death in the family (17.0% for women vs. 12.3% for men), were significant stressors. In addition, women were twice as likely as men to indicate that personal health problems (8.6% for women vs. 4.0% for men), were a significant source of stress.

8.3 Stress and Productivity Loss

We also asked respondents about loss of productivity at work. Military personnel were asked to indicate on how many work days in the past 12 months any of the following things happened to them:

- they were late for work by 30 minutes or more;
- they left work early for a reason other than an errand or early holiday leave;
- they were hurt in an on-the-job accident;
- they worked below their normal level of performance; and
- they did not come to work at all because of an illness or a personal accident.

Table 8.3 shows the percentages of military personnel who reported these performance problems during the past year across four categories of occurrence: any occurrence, one time, two or three times, and four or more times. Findings are displayed for all military

Table 8.3 Perceived Stress and Productivity Loss, Past 12 Months, Total DoD

Group/ Problem	Number of Occurrences, Past 12 Months			
	Any	1 Time	2 or 3 Times	4 or More Times
All Personnel				
Late for work by 30 minutes or more	28.4 (0.7)	12.5 (0.4)	11.2 (0.5)	4.7 (0.3)
Left work early	31.1 (0.5)	6.0 (0.2)	11.9 (0.4)	13.3 (0.4)
Hurt in an on-the-job accident	9.6 (0.6)	6.0 (0.4)	2.6 (0.2)	0.9 (0.2)
Worked below normal performance level	30.6 (0.6)	5.1 (0.3)	10.4 (0.3)	15.1 (0.5)
Did not come into work because of illness or injury	21.5 (0.7)	7.8 (0.2)	8.3 (0.4)	5.4 (0.3)
High Level of Stress, Past 12 Months[a]				
Late for work by 30 minutes or more	33.6 (0.9)	13.6 (0.5)	13.5 (0.7)	6.5 (0.4)
Left work early	35.3 (0.7)	6.4 (0.3)	13.1 (0.5)	15.8 (0.7)
Hurt in an on-the-job accident	12.5 (0.7)	7.3 (0.4)	3.9 (0.3)	1.4 (0.3)
Worked below normal performance level	39.4 (0.8)	5.7 (0.4)	12.2 (0.4)	21.5 (0.8)
Did not come into work because of illness or injury	25.1 (1.0)	8.6 (0.4)	9.2 (0.5)	7.4 (0.5)
Moderate or Low Level of Stress, Past 12 Months[b]				
Late for work by 30 minutes or more	23.6 (0.7)	11.5 (0.6)	9.0 (0.4)	3.0 (0.3)
Left work early	27.2 (0.7)	5.5 (0.3)	10.9 (0.5)	10.8 (0.5)
Hurt in an on-the-job accident	6.8 (0.6)	4.8 (0.5)	1.5 (0.2)	0.5 (0.1)
Worked below normal performance level	22.5 (0.7)	4.6 (0.3)	8.7 (0.4)	9.2 (0.5)
Did not come into work because of illness or injury	18.2 (0.7)	7.1 (0.3)	7.6 (0.5)	3.6 (0.2)

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

[a]Defined as a "great deal" or a "fairly large amount" of stress either at work *or* in the family in the past 12 months.

[b]Defined as "some," "a little," or no stress both at work *and* in the family in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

personnel and for personnel who reported a "great deal" or a "fairly large amount" of stress at work or in personal relationships within the past 12 months (high stress group) and for personnel who report "some," "a little," or no stress both at work and in the family in the past 12 months (moderate/low-stress group).

The findings for perceived stress and productivity loss show a consistent trend. Military personnel who were experiencing high levels of job-related or personal stress were more likely to experience productivity loss in the domains assessed than their counterparts who perceived low to moderate levels of stress. Injuries due to accidents in the workplace were nearly twice as prevalent for personnel in the high-stress group (12.5%) as they were for respondents in the moderate/low-stress group (6.8%). Frequent poor job performance (i.e., four or more occurrences) was also approximately twice as prevalent in the high-stress group (21.5%) as in the group that had moderate/low levels of stress (9.2%). A greater percentage of persons in the high-stress group than in the moderate/low-stress group experienced high absenteeism (7.4% vs. 3.6%), late arrival to work (6.5% vs. 3.0%), and leaving work early (15.8% vs. 10.8%).

These findings are consistent with an extensive body of research that shows a strong relationship between high levels of stress and impaired occupational functioning, including increased absenteeism, lower levels of productivity, and more interpersonal problems. It is likely that Service personnel who are experiencing high levels of stress at work, in their personal lives, or in both of these domains are at increased risk for a host of adverse psychological and health outcomes. Chronic work-related and family-related stress is also likely to increase job turnover, an outcome that could potentially compromise military readiness.

8.4 Screening for Depression

We also included four items similar to those frequently used in psychiatric epidemiologic surveys to screen for the presence of possible depressive symptoms and syndromes. One item was designed to screen for possible major depressive syndrome by asking, "In the past 12 months, have you had 2 weeks or more during which you felt sad, blue, or depressed, or when you lost all interest in things that you usually cared about or enjoyed?" Two items screened for possible dysthymic-like symptoms by asking (a) "In the past 12 months, have you felt depressed or sad much of the time?" and (b) "In your entire life, have you ever had 2 years or more when you felt sad or depressed on most days, even if you felt okay sometimes?" A fourth item asked about the number of days of depressed mood during the past week.

We combined screening items to develop a composite indicator of respondents' probable need for further assessment for depression using clinical evaluation methods; we used the brief scale developed by Rost, Burnam, and Smith (1993). Table 8.4 shows, by

Table 8.4 Need for Further Assessment for Depression, by Selected Sociodemographic Characteristics

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	18.4 (1.3)	19.7 (1.9)	20.0 (2.0)	11.7 (0.6)	17.1 (0.8)
Female	24.4 (2.0)	22.4 (2.0)	26.8 (2.0)	15.6 (1.1)	20.8 (1.0)
Race/Ethnicity					
White, non-Hispanic	19.1 (1.6)	20.6 (2.8)	20.3 (2.0)	12.3 (0.8)	17.5 (1.1)
Black, non-Hispanic	17.2 (1.7)	17.4 (2.4)	18.4 (2.2)	12.9 (1.5)	16.4 (1.1)
Hispanic	24.1 (2.0)	23.0 (5.7)	21.5 (2.5)	11.8 (1.6)	20.7 (1.8)
Other	20.1 (2.2)	17.8 (4.7)	22.5 (3.7)	11.5 (1.8)	17.3 (2.1)
Education					
High school or less	23.6 (1.7)	22.9 (1.8)	22.5 (2.1)	15.5 (1.4)	21.8 (1.0)
Some college	18.5 (1.1)	21.2 (1.6)	21.1 (1.9)	12.8 (1.0)	17.4 (0.7)
College graduate or higher	12.8 (1.8)	9.5 (1.9)	7.2 (1.3)	8.6 (0.6)	10.1 (0.8)
Age					
20 or younger	26.4 (3.8)	30.2 (2.9)	28.2 (3.0)	17.4 (2.0)	26.1 (1.8)
21-25	22.7 (1.8)	26.2 (3.2)	25.2 (2.0)	15.1 (1.1)	22.1 (1.3)
26-34	16.9 (1.6)	17.5 (1.8)	12.5 (1.2)	11.0 (1.0)	14.9 (0.8)
35 or older	12.5 (1.2)	11.8 (0.9)	8.6 (1.1)	9.7 (0.7)	11.0 (0.5)
Marital Status					
Not married	25.7 (1.9)	26.8 (1.8)	25.2 (2.2)	16.2 (1.2)	23.6 (1.0)
Married	14.6 (1.3)	15.7 (1.6)	15.3 (1.2)	10.4 (0.6)	13.6 (0.7)
Pay Grade					
E1-E3	30.3 (2.5)	28.6 (1.6)	30.0 (2.7)	19.4 (1.4)	27.3 (1.1)
E4-E6	19.7 (1.4)	20.8 (1.9)	17.9 (1.2)	12.2 (1.0)	17.7 (0.8)
E7-E9	12.5 (1.0)	12.6 (1.2)	9.4 (1.0)	10.7 (1.2)	11.7 (0.6)
W1-W5	7.1 (2.5)	12.4 (2.0)	7.0 (1.6)	NA (NA)	7.9 (1.8)
O1-O3	8.7 (1.7)	10.2 (1.6)	4.9 (1.0)	6.7 (1.2)	8.0 (0.8)
O4-O10	7.5 (1.4)	5.0 (1.4)	7.0 (1.3)	8.0 (1.0)	7.1 (0.7)
Region					
CONUS[a]	19.5 (1.5)	20.3 (1.8)	19.8 (1.7)	12.4 (0.7)	17.8 (0.8)
OCONUS[b]	18.4 (1.9)	17.9 (2.0)	22.1 (5.4)	11.7 (1.3)	16.7 (1.2)
Total	19.2 (1.3)	20.0 (1.7)	20.3 (1.8)	12.3 (0.6)	17.6 (0.7)

Note: Table entries are percentages of personnel who met the following criteria: (a) extended period of depression, based on either a report of feeling sad, blue, or depressed for 2 weeks or more in the past 12 months, or 2 or more years lifetime of feeling depressed and feeling depressed "much of the time" in the past 12 months; *and* (b) feeling depressed on 1 or more days in the past week. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

NA = Not applicable.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside of the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

selected sociodemographic characteristics, the percentages of military personnel who met this composite screening criteria at a level indicating need for further assessment for depression. Sociodemographic characteristics were gender, race/ethnicity, education, age, marital status, pay grade, and geographic region where the respondent was stationed.

Consistent with findings on depression from major epidemiologic surveys of psychiatric disorder in the general population of the United States, such as the Epidemiologic Catchment Area Program (Regier et al., 1990) and the National Comorbidity Survey (Kessler et al., 1994), we find some evidence, albeit modest, for gender differences in the need for further assessment for depression. For the total DoD, a slightly higher percentage of women than men responded to the depression screening questions in a direction suggestive of need for more comprehensive evaluation for depression. The percentage of women who met criteria on the screener for depression was 20.8% for the DoD and ranged from 15.6% of Air Force women to 26.8% of Marine Corps women. For men in the total DoD, 17.1% needed further assessment for depression, with percentages in specific Services ranging from 11.7% (Air Force) to 20.0% (Marine Corps). Rates for both men and women for the Army, Navy, and Marine Corps were similar and notably higher than for the Air Force.

Analysis of the apparent need for further evaluation for depression by race/ethnicity shows that a somewhat higher percentage of Hispanic military personnel (20.7%) met the criteria for depression compared to whites (17.3%), other racial/ethnic groups (17.3%), and blacks (16.4%). Although the magnitude of these differences is modest, they are nonetheless consistent with findings from the National Vietnam Veterans Readjustment Study (Kulka et al., 1990), which found higher rates of psychiatric disorder among Hispanic veterans in comparison to their counterparts in other racial/ethnic groups.

Age, educational attainment, and pay grade were all inversely related to the need for further assessment for depression. For the total DoD, those who were younger, less well educated, single, and in lower enlisted pay grades were more likely to screen high for depression. These rates were similar for personnel in the Army, Navy, and Marine Corps, all of which were higher than for personnel in the Air Force. Marital status was also related to the need for further evaluation, with 23.6% of unmarried personnel screening high compared to 13.6% of married personnel, a pattern that was consistent across all Services.

8.5 Coping with Stress and Depressive Symptoms

Coping has been defined in terms of the strategies and processes that individuals use to modify adverse aspects of their environment, as well as to minimize internal distress induced by environmental demands (Lazarus, 1966; Moos & Billings, 1982). An

important dimension of coping is the distinction between problem-focused coping strategies, defined as efforts to recognize, modify, or eliminate the impact of a stressor, and emotion-focused coping strategies, defined as efforts to regulate negative emotions that occur in reaction to a stressor event (Auerbach, 1989; Lazarus & Folkman, 1984). There is some empirical evidence that problem-focused or approach-oriented coping strategies that attempt to manage the problem are among the more effective ways to deal with stress, although the utility of any approach depends on the demands of the situation and the skill and flexibility of individuals in using various coping strategies.

We asked respondents to identify the types of strategies that they used to cope when they "feel pressured, stressed, depressed, or anxious." The list of response categories included items that tap approach and problem-oriented strategies ("think of plan to solve the problem"); emotion-focused strategies, such as seeking social support ("talk to friend or family member"); and avoidance coping ("have a drink," "smoke marijuana or use other illegal drugs," "think about hurting yourself or killing yourself"). Table 8.5 shows the percentage of personnel who commonly used specific coping strategies under conditions of stress, by Service. Table 8.6 shows the distribution of these percentages, by gender for the total DoD.

As shown in Table 8.5, "thinking of plans to solve problems" was overwhelmingly indicated by military personnel as a "frequently" or "sometimes" implemented coping strategy (87.3%), followed by "talk to friends or family member" (71.9%) and "exercise or play sports" (63.0%). Across all Services, a solid majority of personnel often used these potentially effective problem-focused and approach-oriented coping strategies to deal with stress, daily pressures, and feelings of depression. With respect to generally less effective avoidant coping strategies, 47% indicated that they "get something to eat" when confronted with stress, 23.5% "have a drink," and less than 1% used illegal substances. Just over 4% of military personnel considered hurting themselves or committing suicide as a coping option for stress and/or depressive symptoms. With respect to variations by branch of Service, Air Force personnel indicated considerably less use of tobacco, alcohol, illegal drugs, and suicidal ideation as coping strategies than did personnel in the other Services. Table 8.6 shows some potentially significant gender differences. Women were more likely to use social support as a coping strategy than were men (87.6% vs. 69.7%, respectively), but were less likely to turn to alcohol as a method of coping (16.8% women vs. 24.4% men). Women also reported a greater tendency than men toward using food substances as a method of coping with stress, anxiety, and depression (57.2% vs. 45.5%, respectively).

8.6 Alcohol Use, Stress, and Mental Health

We also examined the relationship of alcohol use during the past 30 days to perceived stress at work and in family life, to mental health, and to the need for further

Table 8.5 Behaviors for Coping with Stress, by Service

Coping Behavior	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Talk to friend/family member	70.1 (0.9)	71.2 (1.5)	68.4 (1.0)	76.0 (0.8)	71.9 (0.6)
Light up a cigarette	28.6 (1.4)	28.8 (1.2)	27.3 (1.7)	21.0 (1.1)	26.4 (0.7)
Have a drink	25.4 (1.8)	24.4 (1.2)	29.6 (2.3)	17.9 (1.1)	23.5 (0.8)
Exercise or play sports	62.2 (2.2)	59.6 (1.6)	68.2 (1.0)	65.3 (0.9)	63.0 (0.9)
Get something to eat	45.9 (1.4)	47.2 (1.2)	44.4 (1.4)	49.0 (0.6)	47.0 (0.6)
Smoke marijuana/use illegal drugs	1.5 (0.4)	0.7 (0.2)	1.0 (0.3)	0.1 (0.1)	0.8 (0.1)
Think of plan to solve problem	86.3 (1.0)	86.7 (1.0)	85.6 (1.0)	89.8 (0.5)	87.3 (0.5)
Consider hurting or killing yourself	4.3 (0.4)	5.4 (0.7)	5.5 (0.6)	2.3 (0.2)	4.2 (0.3)

Note: Table entries are percentages of personnel who "frequently" or "sometimes" engage in a behavior when they feel pressured, stressed, depressed, or anxious (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 8.6 Behaviors for Coping with Stress, by Gender, Total DoD

Coping Behavior	Gender: Men	Women	Total DoD
Talk to friend/family member	69.7 (0.5)	87.6 (0.7)	71.9 (0.6)
Light up a cigarette	26.7 (0.8)	24.0 (1.0)	26.4 (0.7)
Have a drink	24.4 (0.9)	16.8 (1.0)	23.5 (0.8)
Exercise or play sports	63.4 (0.9)	60.1 (1.5)	63.0 (0.9)
Get something to eat	45.5 (0.7)	57.2 (1.2)	47.0 (0.6)
Smoke marijuana/use illegal drugs	0.8 (0.1)	0.8 (0.2)	0.8 (0.1)
Think of plan to solve problem	87.1 (0.5)	89.3 (0.8)	87.3 (0.5)
Consider hurting or killing yourself	4.2 (0.3)	3.8 (0.4)	4.2 (0.3)

Note: Table entries are percentages of personnel who "frequently" or "sometimes" engage in a behavior when they feel pressured, stressed, depressed, or anxious (with standard errors in parentheses).

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

assessment for depression. Table 8.7 reports findings for those who did not use any alcohol (i.e., abstainers), those who used any alcohol, and those who were heavy drinkers. It should be noted that the measures of any alcohol use and heavy alcohol use are not mutually exclusive. Any use encompasses all levels of drinking, including heavy drinking.

As shown in Table 8.7, there was a relationship between alcohol use and the stress and mental health measures. The most notable differences occurred among abstainers and heavy drinkers. In particular, heavy alcohol users were more likely than abstainers

- to perceive a great deal or large amount of stress at work (46.3% vs. 36.1%) or in their family life (26.5% vs. 19.3%),
- to experience 11 or more days during the month when their mental health was not good (20.1% vs. 10.4%), and
- to be more likely to meet the criteria for needing further depression assessment (27.0% vs. 14.3%).

Thus, we find a strong relationship between heavy drinking and mental health problems, including depression. Those who drank heavily were more likely to screen high for depression and report more days with mental health problems. These findings are consistent with other national studies showing high rates of comorbidity (i.e, the simultaneous occurrence of two or more disorders in one person) between substance use and mental health problems, both in the general population of the United States (Regier et al., 1990) and among military veterans (Kulka et al., 1990). In addition, although it is clear that there is also a relationship between heavy drinking and stress at work, the data do not allow us to infer the direction of the relationship. However, it seems more likely that alcohol would be used as a relatively ineffective avoidance strategy for coping with stress than as a precursor of stress.

8.7 Summary

This chapter examined a variety of mental health issues among military personnel, including stress, coping mechanisms, symptoms of depression, and relationships between alcohol use and mental health problems.

8.7.1 Levels and Sources of Stress

For the total DoD, higher percentages of military personnel rated their jobs as more stressful than their personal lives.

- The most frequently indicated stressor for both men (23.7%) and women (21.1%) was separation from family.
- Men (17.1%) were more likely than women (6.9%) to experience stress due to deployment.

Table 8.7 Alcohol Use, Stress, and Mental Health Problems, Total DoD

Problem/Level	Alcohol Use, Past 30 Days: None	Any	Heavy	Total
Stress at Work, Past 12 Months				
Great deal/large amount	36.1 (1.3)	40.1 (1.0)	46.3 (1.5)	39.3 (0.9)
Some/a little	50.3 (1.3)	50.8 (0.8)	45.1 (1.3)	50.7 (0.8)
None	13.6 (0.7)	9.1 (0.4)	8.6 (0.8)	10.0 (0.4)
Stress in Family, Past 12 Months				
Great deal/large amount	19.3 (0.7)	23.2 (0.4)	26.5 (1.4)	22.4 (0.4)
Some/a little	56.4 (0.9)	57.5 (0.7)	51.4 (1.6)	57.3 (0.6)
None	24.3 (0.8)	19.2 (0.5)	22.1 (1.2)	20.3 (0.4)
Days That Mental Health Was Not Good, Past 30 Days[a]				
11 or more days	10.4 (0.8)	12.6 (0.7)	20.1 (1.3)	12.2 (0.7)
4-10 days	11.1 (0.6)	12.4 (0.4)	14.7 (1.0)	12.2 (0.4)
1-3 days	28.7 (1.0)	33.3 (0.5)	32.4 (1.5)	32.3 (0.4)
None	49.8 (1.2)	41.7 (1.0)	32.8 (1.3)	43.4 (0.9)
Need for Further Depression Assessment[b]				
Yes	14.3 (0.8)	18.5 (0.8)	27.0 (1.7)	17.6 (0.7)
No	85.7 (0.8)	81.5 (0.8)	73.0 (1.7)	82.4 (0.7)

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

[a]Based on respondents' perception of number of days when mental health was not good.

[b]Percentages who met the following criteria: (a) extended period of depression in the past 12 months, based on either a report of feeling sad, blue, or depressed for 2 weeks or more in the past 12 months, or 2 or more years lifetime of feeling depressed and feeling depressed "much of the time" in the past 12 months; *and* (b) feeling depressed on 1 or more days in the past week.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

- Women (17.0%) were more likely than men (12.3%) to perceive stressors related to changes in the family.

8.7.2 Stress and Productivity Loss

Personnel experiencing high levels of job-related or family-related stress showed a greater number of indicators of productivity loss. Beyond the issue of productivity loss, the Services should consider the impact of other potential negative outcomes of stress on military functioning, including attrition, lower morale, and medical treatment costs for substance abuse, health, and mental health problems.

8.7.3 Depression

Consistent with findings from psychiatric epidemiologic studies, a somewhat greater percentage of women (20.8%) screened higher for depression than men (17.1%). Those who were younger, less well educated, single, and in the lower enlisted pay grades showed higher rates of depressive symptomatology. The prevalence estimates and differences should be interpreted with caution, recognizing that comprehensive assessment procedures are required to identify cases of specific psychiatric disorders, such as major depressive disorder.

8.7.4 Coping with Stress and Depression

The three most commonly used strategies for coping with stress were adopting a problem-solving approach, seeking social support, and engaging in health-related behaviors, such as exercise. As encouraging as these findings are, however, nearly a quarter of military personnel commonly used alcohol to cope with stress, daily pressures, and feelings of depression.

- Men (24.4%) were more likely than women (16.8%) to have a drink as a coping behavior, whereas women (87.6%) were more likely than men (69.7%) to talk to a friend or family member. Women (57.2%) were also more likely than men (45.5%) to get something to eat as a coping strategy.

- Over 4% of military personnel considered suicide as an option for dealing with stress and depression.

8.7.5 Alcohol, Stress, and Mental Health

Heavy users of alcohol had more problems with stress and more mental health problems than did their counterparts who did not drink. This suggests that there is a strong comorbid relationship between heavy alcohol use and mental health problems and is an area needing further assessment. In particular, it is important to understand the extent of this relationship, the risk factors that contribute to it, and the potential clinical, research, and policy actions that should be taken to address it.

9.0 HEALTH ISSUES AMONG WOMEN IN THE MILITARY

This chapter examines selected health issues among military women, including stress, access to and satisfaction with obstetrical and gynecological (OB/GYN) care, receipt of Pap smears, pregnancy, prenatal care, and substance use during pregnancy. These topics were investigated by inclusion of a special section of questions in the 1995 DoD survey for military women only. Several of the issues allow comparison with levels among civilian women. Additional women's health issues, including substance use, health behaviors, and mental health, have been examined in previous chapters.

9.1 Stress Among Military Women

Many military women reported being under a "great deal" or a "fairly large amount" of stress as women in the Military, as shown in Table 9.1. Overall, 33% of military women reported relatively high levels of stress. Marine Corps women were far more likely than women in the other Services to report these high levels of stress (46.8%), while Air Force women were the least likely to do so (27.2%). About 40% of Army women and 30% of Navy women reported high levels of stress as women in the Military. Although it is not possible here to fully investigate the reasons for these high stress levels, part of the reason may be the fact that women are a relatively small proportion of military personnel, although that proportion is increasing. In 1995, for example, women were 12% of all military personnel (Table 2.4), an increase from about 9% in 1985 (Bray et al., 1986). Among Marine Corps personnel, whose women expressed the highest levels of stress, the proportion of women was lowest of all Services. Fewer than 5% of Marine Corps personnel were women (Table 2.4).

In the total DoD, stress associated with being a woman in the Military was high among "other" racial/ethnic groups compared with whites, blacks, and Hispanics. About 40% of other racial/ethnic groups in the military--primarily Asian Americans--reported relatively high levels of stress. Stress was also higher among those with a high school education or less, younger military personnel, unmarried personnel, and enlisted personnel compared with their counterparts. Military personnel stationed outside the continental United States (OCONUS) were only slightly more likely than those stationed in the continental United States (CONUS) to report high levels of stress. These findings generally held true for each of the Services, although among Air Force personnel there was little variation in levels of stress among racial/ethnic groups or by age. Among Navy personnel, there was little difference in levels of stress by educational level. Among Marine Corps women, who reported the highest levels of stress as military women overall, one-half of women in several demographic subgroups reported high levels of stress: Marine Corps women in "other" racial/ethnic groups, those with some college, those aged 21 to 25, and those stationed in OCONUS locations.

Table 9.1 Stress Associated with Being a Woman in the Military, by Selected Sociodemographic Characteristics

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Race/Ethnicity					
White, non-Hispanic	39.3 (2.9)	28.5 (1.8)	46.5 (3.0)	28.0 (2.5)	31.8 (1.4)
Black, non-Hispanic	36.0 (3.3)	34.3 (3.9)	44.4 (3.7)	26.4 (4.5)	33.4 (2.3)
Hispanic	47.6 (7.8)	25.8 (5.9)	47.3 (6.2)	24.4 (5.6)	34.5 (3.6)
Other	58.1 (7.5)	38.8 (6.8)	55.8 (4.6)	23.7 (5.6)	40.0 (4.1)
Education					
High school or less	51.4 (3.1)	29.9 (2.0)	46.2 (2.7)	28.2 (3.5)	37.3 (1.9)
Some college	36.5 (2.9)	30.9 (3.0)	49.9 (3.5)	30.0 (2.4)	33.2 (1.6)
College graduate or higher	33.9 (3.7)	29.0 (2.5)	35.1 (5.9)	20.5 (3.1)	27.1 (2.2)
Age					
20 or younger	64.0 (6.4)	32.2 (3.2)	48.9 (5.4)	27.1 (3.7)	42.9 (3.3)
21-25	35.3 (3.3)	32.8 (3.2)	50.7 (4.6)	32.1 (5.2)	34.3 (2.3)
26-34	35.4 (2.3)	27.1 (3.6)	42.2 (4.3)	22.5 (2.4)	28.6 (1.6)
35 or older	35.1 (4.3)	29.1 (2.1)	40.6 (5.2)	27.3 (3.5)	30.6 (2.2)
Marital Status					
Not married	44.1 (3.1)	29.5 (2.3)	48.1 (2.7)	31.4 (1.7)	36.2 (1.5)
Married	35.1 (2.4)	30.8 (3.2)	45.6 (2.0)	24.1 (1.9)	30.0 (1.4)
Pay Grade					
Enlisted	40.8 (2.3)	30.1 (1.9)	48.0 (2.1)	29.5 (2.0)	34.3 (1.2)
Officer	35.0 (4.5)	30.5 (3.0)	32.9 (6.9)	17.7 (3.3)	26.6 (2.3)
Region					
CONUS[a]	39.9 (2.1)	29.4 (1.9)	45.8 (2.5)	27.5 (1.9)	32.8 (1.2)
OCONUS[b]	39.7 (4.5)	33.4 (0.6)	50.8 (0.3)	26.1 (3.5)	33.8 (2.3)
Total	39.8 (1.9)	30.2 (1.5)	46.8 (2.0)	27.2 (1.7)	33.0 (1.0)

Note: Table entries are percentages of women who indicated "a great deal" or "a fairly large amount" of stress associated with being a woman in the Military (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

The levels of stress experienced at work or within the family and behaviors used to cope with stress among military women and men are investigated more fully in Chapter 8. About 40% of all military personnel reported a high level of stress at work, and about 20% reported high stress from family matters. However, those analyses were not done separately for men and women. Military women were likely to report having experienced some stress from their work and family roles, as well as from being women in a predominantly male military. These data suggest that stress management techniques that address issues of coping in a male environment should be broadly disseminated to military women.

9.2 Perceived Quality of OB/GYN Care

Ready access to needed health care services is an important part of maintaining the health of military women and their satisfaction with military service. As shown in Tables 9.2 and 9.3, the majority of military women reported easy access to OB/GYN care, such as pelvic exams or Pap smears, and most were satisfied with services received. However, the data indicate that there is some room for improvement.

Table 9.2 Access to Obstetrical or Gynecological Care for Military Women

Period/ Access	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Since Joining the Military					
Very easy	19.3 (1.8)	26.4 (2.7)	25.7 (2.5)	33.6 (1.2)	26.6 (1.1)
Fairly easy	45.1 (2.9)	48.2 (2.7)	41.7 (1.7)	47.1 (1.4)	46.5 (1.3)
Fairly difficult	18.5 (1.9)	14.8 (1.9)	17.9 (1.5)	10.9 (1.1)	14.7 (0.9)
Very difficult	10.8 (1.6)	7.6 (1.4)	9.0 (1.3)	4.6 (0.9)	7.6 (0.7)
Don't know/ no opinion	6.4 (1.0)	+ (+)	+ (+)	3.7 (0.7)	4.5 (0.5)
At Current Installation					
Very easy	18.0 (1.9)	23.4 (2.3)	25.5 (2.9)	29.6 (2.1)	24.0 (1.2)
Fairly easy	40.6 (2.5)	35.4 (1.5)	37.7 (2.3)	41.2 (1.5)	39.3 (1.1)
Fairly difficult	15.0 (1.9)	14.3 (1.7)	16.1 (1.5)	12.8 (1.8)	14.1 (1.0)
Very difficult	13.6 (2.1)	8.7 (1.8)	8.5 (1.1)	6.7 (1.3)	9.6 (1.0)
Don't know/ no opinion	12.8 (1.3)	18.1 (3.6)	12.3 (1.7)	9.8 (1.3)	13.1 (1.2)

Note: Table entries are percentages of military women (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

About 27% of military women reported that since they joined the Military it had been "very easy" to get OB/GYN care, and 46% reported it had been "fairly easy" to do so (Table 9.2). Thus, about 73% reported that obtaining services was easy overall. Somewhat fewer--about 63%--reported that it had been easy to obtain such services at their current installation. The difference may be due to the fact that some time is required to learn how and where to obtain services at new installations. Air Force women reported the most ease in obtaining OB/GYN services since they joined the Military: About 34% reported that it was very easy and 47% reported that it was fairly easy, for a total of about 80%. Army women were the least likely to report that obtaining these services was easy (about 64%), while 74% of Navy women and 67% of Marine Corps women reported it was easy to obtain these services. Almost 11% of Army women reported that it had been "very difficult" for them to obtain these services since joining the Military, higher than in the other Services, which ranged from 5% to 9%.

As with the ease of obtaining OB/GYN services in the Military overall, Air Force women were the most likely of the four Services to report that obtaining services at their current installation was very easy or fairly easy (71%). However, women in the Marine Corps were the least likely to report ease in obtaining services (63%), with about 59% of Army and Navy women reporting ease in obtaining services at their current installation. About 14% of Army women reported that it had been very difficult to obtain services at their current installation compared with 7% to 9% of women in the other Services.

As shown in Table 9.3, about 62% of military women were very satisfied or satisfied with the quality of OB/GYN care received at their current installations. Air Force women were the most likely (69%) and Army women the least likely to be satisfied with services received (56%), which is consistent with Service differences in ease of access to OB/GYN care. Across the total DoD, and most of the Services, the following sociodemo-graphic groups were less likely to be satisfied with services received: "other" racial/ethnic groups, those with a high school education or less, younger women, unmarried women, and enlisted women. Findings were less consistent for sociodemographic groups among Marine Corps women; Marine Corps, officers and those with college degrees were less likely than others to be satisfied with services received. No differences were observed between DoD women overall who were stationed in CONUS or OCONUS locations.

These findings suggest that the majority of military women found it easy to obtain OB/GYN services and were satisfied with services received. However, perhaps one in three military women expressed some problem with services at their current installations. The nature of these problems and where they are occurring in service delivery require further study.

Table 9.3 Military Women's Degree of Satisfaction with Obstetrical or Gynecological Care, by Selected Sociodemographic Characteristics

Characteristic	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Race/Ethnicity										
White, non-Hispanic	54.6	(3.8)	57.6	(4.0)	61.9	(3.6)	69.8	(4.2)	62.1	(2.4)
Black, non-Hispanic	61.0	(3.2)	68.5	(2.8)	71.0	(2.9)	67.2	(4.5)	64.4	(2.1)
Hispanic	+	(+)	+	(+)	68.6	(5.4)	74.9	(4.5)	65.1	(4.5)
Other	38.5	(7.0)	52.0	(7.4)	+	(+)	63.3	(7.1)	51.9	(4.2)
Education										
High school or less	52.9	(4.0)	58.2	(4.1)	71.9	(3.3)	65.0	(4.9)	59.1	(2.3)
Some college	58.9	(2.7)	58.0	(5.2)	61.0	(3.9)	67.7	(4.2)	62.3	(2.3)
College graduate or higher	54.3	(3.0)	67.2	(2.8)	51.7	(4.7)	75.5	(3.2)	66.3	(2.2)
Age										
20 or younger	54.1	(6.6)	59.6	(3.3)	63.5	(4.8)	65.1	(5.8)	59.4	(3.0)
21-25	56.1	(4.5)	64.1	(7.7)	68.1	(3.1)	61.9	(4.8)	60.8	(2.9)
26-34	55.2	(4.4)	55.4	(3.0)	59.7	(4.0)	75.8	(3.1)	63.2	(2.1)
35 or older	60.5	(3.7)	60.5	(3.8)	62.7	(5.3)	71.9	(3.9)	65.3	(2.4)
Marital Status										
Not married	56.7	(4.2)	56.3	(4.0)	60.7	(2.6)	67.7	(2.3)	60.3	(2.1)
Married	55.9	(3.5)	63.5	(3.8)	67.9	(4.7)	70.3	(4.6)	64.1	(2.4)
Pay Grade										
Enlisted	55.8	(2.8)	58.9	(4.2)	65.2	(2.8)	67.7	(3.7)	61.3	(2.0)
Officer	59.0	(3.2)	64.7	(2.5)	53.6	(4.9)	75.7	(2.9)	67.4	(2.3)
Region										
CONUS[a]	57.3	(2.9)	60.0	(4.4)	65.3	(2.7)	68.0	(4.3)	62.3	(2.3)
OCONUS[b]	53.0	(2.9)	58.4	(2.3)	60.5	(5.5)	73.9	(2.7)	62.2	(1.6)
Total	56.3	(2.4)	59.7	(3.6)	64.3	(2.7)	69.2	(3.5)	62.3	(1.8)

Note: Table entries are percentages of military women who indicated they were "very satisfied" or "satisfied" with the quality of care at their current installations (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

9.3 Cervical Cancer Risk Reduction

The major way that women can lessen the risk of cancer of the cervix is through regular Pap smear tests. As shown in Table 9.4, 97% of military women had had such tests in their lifetimes and 95% had had the tests within the past 3 years. There is not a great deal of variation across demographic subgroups. However, Army women were slightly less likely than women in the other Services to have had the tests within the past 3 years (93% vs. 95% to 97%) or within their lifetimes (95% vs. 97% to 98%). Although not all the tests occurred after entering military service (not all military women who responded to the survey had been in the service 3 years), the slight difference among the Services in obtaining Pap smears should be recognized. Similarly, Hispanics and other racial/ethnic groups were somewhat less likely than whites and blacks to have had the tests, either in their lifetimes or in the past 3 years. The prevalence of testing was slightly lower among those with a high school education or less, younger military personnel, unmarried personnel, and enlisted personnel. Some of these subgroup differences were likely related to age; married personnel and those with more education were older on average, and older personnel were more likely to have had the tests partially because they had had a longer time period in which to have had them. Further, as discussed in Chapter 1, the receipt of Pap smears among civilian women is closely related to income level; lower income women are less likely to receive the tests. These subgroup differences in the receipt of tests may mark where additional service efforts should be targeted. However, some of these subgroup differences may reflect differential access to services prior to joining the Military.

Despite these small subgroup differences, what is notable is the near universality of receipt of Pap smears. Indeed, as noted in Chapter 3, military women overall exceeded the *Healthy People 2000* objectives of 95% having ever had a Pap smear and 85% having had one in the past 3 years. However, about 94% of Hispanic and "other" racial/ethnic group women reported having ever had a Pap smear, slightly lower than the objective of 95%. All sociodemographic subgroups examined here exceeded the 85% objective for receipt of service during the past 3 years. These rates of obtaining Pap smears were substantially higher than comparable rates among civilians and reflect both ready access and mandatory care at specified intervals for military women. According to the 1990 National Health Interview Survey (NHIS), for example, about one-half of all women aged 18 and older had ever had a Pap smear. The percentage receiving the test was directly related to income level: 41% of women in households with incomes under $10,000 had ever had the test compared with 59% with incomes of $50,000 or more (Piani & Schoenborn, 1993; Schoenborn, 1988). Data from the 1991 Behavioral Risk Factor Surveillance System (BRFSS) indicate somewhat higher median percentages: 92% for women over age 18 in the lifetime and 80% within the past 2 years (Siegel et al., 1993).

Table 9.4 Receipt of Pap Smears by Military Women, by Selected Sociodemographic Characteristics

Characteristic	Recency: Past 3 Years	Recency: Lifetime
Service		
Army	92.9 (1.8)	95.2 (1.5)
Navy	96.0 (0.9)	98.4 (0.5)
Marine Corps	95.3 (0.7)	97.0 (0.6)
Air Force	96.7 (0.6)	97.9 (0.5)
Race/Ethnicity		
White, non-Hispanic	95.4 (0.6)	97.6 (0.5)
Black, non-Hispanic	96.0 (1.2)	97.7 (1.1)
Hispanic	93.9 (2.5)	94.0 (2.5)
Other	92.2 (2.7)	93.9 (2.3)
Education		
High school or less	94.6 (1.0)	96.0 (1.0)
Some college	95.1 (1.0)	97.0 (0.8)
College graduate or higher	96.1 (0.9)	98.6 (0.6)
Age		
20 or younger	92.2 (2.3)	93.5 (2.0)
21-25	94.8 (1.4)	96.4 (1.1)
26-34	96.0 (0.8)	98.5 (0.5)
35 or older	97.0 (0.7)	99.0 (0.5)
Marital Status		
Not married	93.2 (1.4)	95.1 (1.2)
Married	97.1 (0.5)	99.0 (0.3)
Pay Grade		
Enlisted	94.8 (0.9)	96.6 (0.7)
Officer	97.4 (0.6)	99.6 (0.2)
Total	95.2 (0.7)	97.1 (0.6)

Note: Table entries are percentages of military women with an intact uterine cervix (with standard errors in parentheses). Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

9.4 Maternal and Infant Health

Regular prenatal care and avoidance of substance use during pregnancy are important in ensuring maternal and infant health. Substance use during pregnancy has been linked to a variety of birth and developmental outcomes, such as prematurity, low birth weight, and congenital malformations (Chasnoff et al., 1989; Edmondson 1985; NIDA, 1995). Pregnancy among military women is also an important factor in military readiness.

9.4.1 Pregnancy and Use of Prenatal Care Services

As shown in Table 9.5, about 18% of military women reported that they had been pregnant within the past year and another 1.5% that they may have been pregnant at the time of the survey but that they were unsure. The percentage who had been pregnant within the past year includes those who were currently pregnant or who had had a livebirth or whose pregnancy may have been terminated. Across all the Services, about 38% of military women had been pregnant within the past 5 years, although some of these pregnancies were likely to have occurred prior to military service. The percentage of Marine Corps women who had been pregnant within the past year (21%) was higher than that of the other Services (Air Force 19%, Army 17%, Navy 16%). The Navy had the highest percentage of women who had never been pregnant (45%). Part of these differences by Service may be related to differences in age and other sociodemographic characteristics among women across the Services.

Table 9.5 Pregnancy History Among Military Women

	Service				
Recency	Army	Navy	Marine Corps	Air Force	Total DoD
Never Been Pregnant	37.5 (2.3)	44.6 (3.2)	38.4 (2.4)	41.7 (2.1)	40.9 (1.4)
May Currently Be Pregnant[a]	2.2 (1.0)	1.4 (0.4)	0.9 (0.3)	0.9 (0.4)	1.5 (0.4)
Past Year[b]	17.4 (1.6)	16.4 (1.6)	21.6 (2.3)	19.2 (1.7)	18.0 (0.9)
Past 1 to 2 Years	7.7 (1.2)	6.7 (0.9)	8.4 (1.2)	7.3 (0.9)	7.3 (0.6)
Past 2 to 5 Years	13.2 (1.4)	13.1 (1.3)	14.8 (2.5)	12.6 (1.1)	13.0 (0.7)
More Than 5 Years Ago	22.0 (2.1)	17.8 (2.3)	15.7 (2.6)	18.2 (1.2)	19.3 (1.0)

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

[a]Estimate based on women who indicated that they may have been pregnant at the time of the survey but did not know for certain.

[b]Includes women who were pregnant at the time of the survey.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

The vast majority of military women who had been pregnant within the past 5 years had received prenatal care within the first trimester of their pregnancy, 81.8% of all DoD women (see Table 9.6). These rates were slightly lower among women in the Army and Marine Corps, at about 80%. Despite the fact that more than 80% of all military women began to receive prenatal care early in their pregnancy, substantial percentages did not. Indeed, about 1 in 10 military women who were being pregnant within the past 5 years began to receive prenatal care only during the third trimester or not at all (9.7%). The percentage was higher among Marine Corps women (11.7%). Further investigation is necessary to determine the proportion of these pregnancies that occurred during military service and the demographic correlates of receiving prenatal care services. However, a number of military women surveyed appear to have had inadequate prenatal care during their last pregnancy.

9.4.2 Alcohol and Cigarette Use During Pregnancy

A *Healthy People 2000* objective states that the percentage of women using alcohol during pregnancy should be reduced by at least 20%. Responses from the 1995 DoD survey provide a baseline from which to measure change. As shown in Table 9.7, about 14% of all military women who were pregnant in the past 5 years consumed some alcohol during their most recent pregnancy. This percentage was somewhat higher among several demographic subgroups of military women: About 26% of those aged 35 or older consumed alcohol during their last pregnancy, as did about 21% of officers and 21% of those who received prenatal care during the last trimester of their pregnancy or not at all. Any alcohol consumption during pregnancy was more likely among Navy women (18%) than women in the other Services (12% to 15%) and among whites, college graduates, and married women compared with their counterparts.

Although these percentages include those who drank only on one or two occasions, some military women drank more frequently. About 3% of military women drank several times a month or more. More frequent drinking was somewhat more common among Navy women (4%) compared with women in the other Services and among women with a high school education or less (5.2%), those aged 21 to 25 (3.6%), unmarried women (5.0%), and enlisted women (2.8%). More frequent drinking was especially common among those with inadequate prenatal care (i.e., those women receiving prenatal care only during the third trimester or not at all). Approximately 11% of these women drank several times a month or more, compounding the effects of poor prenatal care.

Table 9.6 Receipt of Prenatal Care During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics

Characteristic	Trimester of First Prenatal Care Visit[a]					
	First		Second		Third or None	
Service						
Army	80.3	(2.6)	10.0	(2.1)	9.7	(2.2)
Navy	84.2	(1.6)	6.7	(1.8)	9.1	(1.5)
Marine Corps	80.1	(3.1)	8.2	(2.1)	11.7	(2.4)
Air Force	81.9	(2.5)	8.2	(1.5)	9.8	(1.7)
Race/Ethnicity						
White, non-Hispanic	83.7	(1.7)	5.8	(1.0)	10.5	(1.4)
Black, non-Hispanic	78.8	(3.2)	13.5	(2.8)	7.7	(2.0)
Hispanic	76.8	(5.3)	12.2	(4.1)	11.0	(4.3)
Other	84.9	(4.6)	4.5	(2.0)	10.6	(3.9)
Education						
High school or less	79.2	(2.5)	8.7	(1.7)	12.1	(2.3)
Some college	82.4	(1.8)	8.7	(1.3)	8.9	(1.3)
College graduate or higher	85.1	(2.5)	6.9	(2.7)	7.9	(2.6)
Age						
20 or younger	71.0	(4.6)	8.0	(2.6)	21.0	(4.7)
21-25	80.9	(2.2)	8.5	(1.5)	10.5	(1.9)
26-34	83.9	(2.2)	8.9	(1.8)	7.2	(1.3)
35 or older	91.0	(2.8)	6.7	(2.3)	2.2	(1.1)
Marital Status						
Not married	74.6	(2.8)	8.5	(1.6)	16.9	(2.3)
Married	85.8	(1.7)	8.4	(1.1)	5.7	(1.1)
Pay Grade						
Enlisted	81.7	(1.4)	8.7	(1.0)	9.6	(1.1)
Officer	83.0	(3.4)	6.7	(3.3)	10.3	(3.4)
Total	81.8	(1.3)	8.4	(1.0)	9.7	(1.0)

Note: Table entries are percentages of military women who were pregnant in the past 5 years (with standard errors in parentheses). Estimates were based on 1,077 women who were pregnant in the past 5 years. Estimates have not been adjusted for sociodemographic differences among Services.

[a]First trimester = months 1-3 of pregnancy; second trimester = months 4-6 of pregnancy; third trimester = month 7 or later.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 9.7 Alcohol Use During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics

Characteristic	Alcohol Use: None		Alcohol Use: Any		Alcohol Use: Several Times a Month[a]	
Service						
Army	88.1	(2.1)	11.9	(2.1)	1.6	(0.8)
Navy	82.1	(2.8)	17.9	(2.8)	4.4	(1.7)
Marine Corps	87.5	(1.6)	12.5	(1.6)	0.4	(0.4)
Air Force	85.4	(2.1)	14.6	(2.1)	2.8	(0.7)
Race/Ethnicity						
White, non-Hispanic	82.4	(1.4)	17.6	(1.4)	2.9	(0.7)
Black, non-Hispanic	89.4	(1.9)	10.6	(1.9)	2.7	(1.1)
Hispanic	90.9	(3.4)	9.1	(3.4)	+	(+)
Other	90.2	(4.5)	9.8	(4.5)	3.1	(1.9)
Education						
High school or less	85.3	(2.1)	14.7	(2.1)	5.2	(1.4)
Some college	86.8	(1.8)	13.2	(1.8)	1.6	(0.6)
College graduate or higher	81.4	(2.5)	18.6	(2.5)	1.4	(0.8)
Age						
20 or younger	94.0	(2.1)	6.0	(2.1)	2.3	(1.6)
21-25	85.5	(1.8)	14.5	(1.8)	3.6	(1.0)
26-34	85.8	(2.0)	14.2	(2.0)	2.0	(0.8)
35 or older	74.3	(3.9)	25.7	(3.9)	2.0	(1.3)
Marital Status						
Not married	86.5	(2.3)	13.5	(2.3)	5.0	(1.5)
Married	85.1	(1.6)	14.9	(1.6)	1.4	(0.4)
Pay Grade						
Enlisted	86.4	(1.4)	13.6	(1.4)	2.8	(0.7)
Officer	78.9	(3.0)	21.1	(3.0)	1.9	(1.0)
Prenatal Care						
Any in first or second trimester[b]	86.5	(1.3)	13.5	(1.3)	1.8	(0.5)
Third trimester or none	78.9	(4.8)	21.1	(4.8)	11.3	(3.3)
Total	85.6	(1.2)	14.4	(1.2)	2.7	(0.6)

Note: Table entries are percentages of military women who were pregnant in the past 5 years (with standard errors in parentheses). Estimates were based on 1,077 women who were pregnant in the past 5 years. Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

[a]Defined as any alcohol use several times a month or more often during the most recent pregnancy.

[b]First trimester = months 1-3 of pregnancy; second trimester = months 4-6 of pregnancy; third trimester = month 7 or later.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Although some of these pregnancies may have occurred prior to military service, these findings suggest groups of military women to whom educational efforts regarding the effects of alcohol on fetal development should be targeted. However, the groups of women who were more likely to drink at all during pregnancy were not always the same as those who were likely to drink with greater frequency. For example, although military women were more likely to have consumed any alcohol during pregnancy, unmarried women were more likely to have consumed alcohol several times a month or more.

A related *Healthy People 2000* objective states that the proportion of women who do not smoke during pregnancy should be greater than or equal to 90%. As shown in Table 9.8 (see also discussion in Chapter 3), military women overall had not yet reached this objective. About 84% of military women who were pregnant during the past 5 years reported no cigarette use during their most recent pregnancy; about 16% reported some cigarette use; and approximately 3% reported heavy use (smoking a pack a day or more). Only the following groups of military women had obtained the 90% objective of no smoking during pregnancy: college graduates, officers, and "other" racial/ethnic groups. The lowest rate of nonsmoking was found among those women who began to receive prenatal care during the last trimester of their pregnancy or received no prenatal care at all (77.2%). For these women, the effects of receiving inadequate prenatal care was compounded by their smoking. Rates of heavy smoking during pregnancy were slightly higher among several subgroups: those who received prenatal care during the third trimester or not at all (7.8%), whites (4.7%), and Marine Corps women (4.3%).

Thus, greater preventive efforts need to be directed at those military women who used alcohol or smoked cigarettes during their last pregnancy. These efforts could be coupled with efforts to increase the percentage of women who receive prenatal care early in their pregnancies. However, the types of military women who drank during their last pregnancies differ from those who smoked during their last pregnancy, suggesting that preventive efforts directed toward decreasing alcohol use or smoking during pregnancy should be targeted to different groups of women.

9.5 Summary

This chapter has investigated several health issues that may affect the readiness of military women: stress associated with being a woman in the Military, access to and satisfaction with OB/GYN care, receipt of Pap smears, pregnancy, prenatal care, and substance use during pregnancy.

Table 9.8 Cigarette Use During Most Recent Pregnancy, Past 5 Years, by Selected Sociodemographic Characteristics

Characteristic	Cigarette Use: None		Cigarette Use: Any		Cigarette Use: Heavy[a]	
Service						
Army	83.3	(2.9)	16.7	(2.9)	3.0	(1.4)
Navy	81.8	(2.3)	18.2	(2.3)	3.7	(0.8)
Marine Corps	83.8	(2.7)	16.2	(2.7)	4.3	(1.8)
Air Force	85.2	(2.4)	14.8	(2.4)	2.6	(1.1)
Race/Ethnicity						
White, non-Hispanic	79.2	(2.1)	20.8	(2.1)	4.7	(1.1)
Black, non-Hispanic	88.0	(2.4)	12.0	(2.4)	0.8	(0.7)
Hispanic	95.1	(3.1)	4.9	(3.1)	0.3	(0.3)
Other	90.5	(3.9)	9.5	(3.9)	1.7	(1.4)
Education						
High school or less	79.1	(2.8)	20.9	(2.8)	3.3	(1.1)
Some college	83.5	(2.1)	16.5	(2.1)	3.4	(0.9)
College graduate or higher	93.4	(2.0)	6.6	(2.0)	+	(+)
Age						
20 or younger	81.2	(3.0)	18.8	(3.0)	3.9	(1.9)
21-25	82.8	(1.7)	17.2	(1.7)	3.4	(1.2)
26-34	83.8	(2.6)	16.2	(2.6)	3.0	(1.2)
35 or older	89.5	(3.4)	10.5	(3.4)	0.8	(0.6)
Marital Status						
Not married	82.5	(2.1)	17.5	(2.1)	3.3	(1.1)
Married	84.3	(1.9)	15.7	(1.9)	2.9	(0.8)
Pay Grade						
Enlisted	82.6	(1.6)	17.4	(1.6)	3.2	(0.7)
Officer	91.5	(2.9)	8.5	(2.9)	1.7	(1.7)
Prenatal Care						
Any in first or second trimester[b]	84.6	(1.6)	15.4	(1.6)	2.4	(0.6)
Third trimester or none	77.2	(4.7)	22.8	(4.7)	7.8	(3.2)
Total	83.6	(1.4)	16.4	(1.4)	3.1	(0.7)

Note: Table entries are percentages of military women who were pregnant in the past 5 years (with standard errors in parentheses). Estimates were based on 1,077 women who were pregnant in the past 5 years. Estimates have not been adjusted for sociodemographic differences among Services.

+Low precision.

[a]Defined as smoking one or more packs of cigarettes per day during the most recent pregnancy.

[b]First trimester = months 1-3 of pregnancy; second trimester = months 4-6 of pregnancy; third trimester = month 7 or later.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

9.5.1 Stress Among Military Women

Many military women reported experiencing a "great deal" or a "fairly large amount" of stress as women in the Military (Table 9.1).

- About one in three military women and almost one-half of women in the Marine Corps reported experiencing high stress as women in the Military.

- Stress associated with being a woman in the Military was higher among "other" racial/ethnic groups, those with a high school education or less, younger personnel, unmarried personnel, and enlisted personnel.

9.5.2 Perceived Quality of OB/GYN Care

Ready access to needed health care services is an important part of maintaining the health of military women and their satisfaction with military service.

- About 73% of military women reported that it was easy to obtain OB/GYN services in the Military, and 63% reported that it had been easy to obtain such services at their current installation (Table 9.2).

- Women in the Air Force were more likely than women in the other Services to report ease in obtaining OB/GYN services in the Military in general or in their current installation (Table 9.2).

- About 62% of military women were satisfied with the quality of OB/GYN care received at their current installations (Table 9.3). Women in the Air Force were more likely to be satisfied and Army women less satisfied with services received.

9.5.3 Cervical Cancer Risk Reduction

Receipt of Pap smears was nearly universal and higher than *Healthy People 2000* objectives for almost all groups of military women (Table 9.4).

- About 97% of military women had had Pap smear tests in their lifetimes, and 95% had done so in the past 3 years.

- There was little variation among the Services or sociodemographic subgroups, although the prevalence of the tests was slightly lower among Army women, Hispanics and "other" racial/ethnic groups, those with a high school education or less, younger women, unmarried women, and enlisted women.

9.5.4 Maternal and Infant Health

Regular prenatal care and avoidance of substance use during pregnancy were important in ensuring maternal and infant health.

- About 18% of military women reported they had been pregnant within the past year, and 38% reported being pregnant within the past 5 years (Table 9.5).
- More than 80% of military women who were pregnant within the past 5 years reported having received prenatal care during the first trimester, but about 10% did not receive it until the last trimester or not at all (Table 9.6).
- About 14% of military women drank during their most recent pregnancy during the past 5 years, and about 3% drank several times a month or more often (Table 9.7).
- About 84% of military women who were pregnant within the past 5 years reported no cigarette use during that pregnancy, a percentage lower than the *Healthy People 2000* objective of 90% (Table 9.8).

These findings suggest that the military women surveyed had good access to health care services, but that their health may have been compromised in several ways. The receipt of Pap smears was nearly universal, OB/GYN services were reportedly easy to obtain, women were satisfied with the quality of care received, and more than 80% of women who had been pregnant within the past 5 years received prenatal care within the first trimester. However, about 33% reported high levels of stress associated with being a woman in the Military, and the percentage smoking during pregnancy exceeded the *Healthy People 2000* objective. About 85% of women who had been pregnant in the past 5 years abstained from alcohol during their last pregnancy. This estimate is a baseline figure for future preventive efforts with the objective of increasing the rate of abstinence by 20%. These findings suggest some areas where further attention is required to maintain the health and readiness of military women.

REFERENCES

Aldwin, C.M. (1993). Coping with traumatic stress. *PTSD Research Quarterly*, *4*(3), 1-3.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Auerbach, S.M. (1989). Stress management and coping research in the health care setting: An overview and methodological commentary. *Journal of Consulting and Clinical Psychology, 57,* 388-395.

Barnett, R.C., & Baruch, G.K. (1985). Women's involvement in multiple roles and psychological distress. *Journal of Personality and Social Psychology*, *49*, 133-145.

Beary, J.F., Mazzuchi, J.F., & Richie, S.I. (1983). Drug abuse in the military: An adolescent misbehavior problem. *Journal of Drug Education, 13*(1), 83-93.

Belloc, N., & Breslow, L. (1972). Relationship of physical health status and health practices. *Preventive Medicine, 1,* 409-421.

Blackmore, J. (1974). The relationship between self-reported delinquency and official convictions amongst adolescent boys. *British Journal of Criminology, 14*, 172-176.

Bray, R.M., Guess, L.L., Mason, R.E., Hubbard, R.L., Smith, D.G., Marsden, M.E., & Rachal, J.V. (1983). *1982 Worldwide Survey of Alcohol and Non-medical Drug Use Among Military Personnel* (RTI/2317/01-01F). Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Kroutil, L.A., Luckey, J.W., Wheeless, S.C., Iannacchione, V.G., Anderson, D.W., Marsden, M.E., & Dunteman, G.H. (1992). *1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel*. Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Kroutil, L.A., & Marsden, M.E. (1995). Trends in alcohol, illicit drug, and cigarette use among U.S. military personnel: 1980-1992. *Armed Forces & Society, 21*, 271-293.

Bray, R.M., Marsden, M.E., Guess, L.L., Wheeless, S.C., Pate, D.K., Dunteman, G.H., & Iannacchione, V.G. (1986). *1985 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel.* Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Marsden, M.E., Guess, L.L., Wheeless, S.C., Iannacchione, V.G., & Keesling, S.R. (1988). *1988 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel.* Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Marsden, M.E., Herbold, J.R., & Peterson, M.R. (1993). Progress toward eliminating drug and alcohol abuse among U.S. military personnel. In J. Stanley & J.D. Blair (Eds.), *Challenges in military health care: Perspectives on health*

status and the provision of care (pp. 33-53). New Brunswick, NJ: Transaction Publishers.

Bray, R.M., Marsden, M.E., & Peterson, M.R. (1991). Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *American Journal of Public Health, 81,* 865-869.

Breslow, L., & Enstrom, J. (1980). Persistence of health habits and their relationship to mortality. *Preventive Medicine, 9,* 469-483.

Burrelli, D.F. (1992). HIV-1/AIDS and U.S. military manpower policy. *Armed Forces & Society, 18,* 452-475.

Burt, M.A., Biegel, M.M., Carnes, Y., & Farley, E.C. (1980). *Worldwide Survey of Non-medical Drug Use and Alcohol Use Among Military Personnel: 1980.* Bethesda, MD: Burt Associates, Inc.

Centers for Disease Control. (1988a). Comparison of observed and self-reported seat belt use rates: United States. *Morbidity and Mortality Weekly Report, 37*, 549-551.

Centers for Disease Control. (1988b, April 29). Cholesterol awareness in selected states: Behavioral Risk Factor Surveillance, 1987. *Morbidity and Mortality Weekly Report, 37*, 245-248.

Centers for Disease Control. (1988c). Condoms for prevention of sexually transmitted diseases. *Morbidity and Mortality Weekly Report, 37*(9), 133-137.

Centers for Disease Control. (1992, February 21). Safety-belt and helmet use among high school students: United States, 1990. *Morbidity and Mortality Weekly Report, 41*, 111-114.

Centers for Disease Control and Prevention. (1993a, November 26). Mortality patterns: United States, 1991. *Morbidity and Mortality Weekly Report, 42*, 891, 897-900.

Centers for Disease Control and Prevention (1993b, November 12). Mortality trends for selected smoking-related cancers and breast cancer: United States, 1950-1990. *Morbidity and Mortality Weekly Report, 42,* 857, 863-866.

Centers for Disease Control and Prevention. (1993c, September 24). Quarterly table reporting alcohol involvement in fatal motor-vehicle crashes. *Morbidity and Mortality Weekly Report, 42,* 729.

Centers for Disease Control and Prevention. (1993d, December 3). Quarterly table reporting alcohol involvement in fatal motor-vehicle crashes. *Morbidity and Mortality Weekly Report, 42,* 923.

Centers for Disease Control and Prevention. (1993e, April 16). Use of smokeless tobacco among adults — United States, 1991. *Morbidity and Mortality Weekly Report, 42*, 263-266.

Centers for Disease Control and Prevention. (1994a, April 22). Deaths from breast cancer: United States, 1991. *Morbidity and Mortality Weekly Report, 43,* 273, 279-281.

Centers for Disease Control and Prevention. (1994b, January 28). Deaths resulting from firearm- and motor-vehicle-related injuries: United States, 1968-1991. *Morbidity and Mortality Weekly Report, 43,* 37-42.

Centers for Disease Control and Prevention. (1994c, March 11). Heterosexually acquired AIDS: United States, 1993. *Morbidity and Mortality Weekly Report, 43,* 155-160.

Centers for Disease Control and Prevention. (1994d). *The national strategic plan for the early detection and control of breast and cervical cancers.* Atlanta: Author.

Centers for Disease Control and Prevention. (1994e, March 11). Update: Impact of the expanded AIDS surveillance case definition for adolescents and adults on case reporting: United States, 1993. *Morbidity and Mortality Weekly Report, 43,* 160-161, 167-170.

Centers for Disease Control and Prevention. (1994f, July 22). Adults taking action to control their blood pressure—United States, 1990. *Morbidity and Mortality Weekly Report*, *43*, 509-511, 517.

Centers for Disease Control and Prevention. (1994g, May 20). Cigarette smoking among adults — United States, 1992, and changes in the definition of current cigarette smoking. *Morbidity and Mortality Weekly Report*, *43*, 342-346.

Centers for Disease Control and Prevention. (1995, June 2). Update: Trends in AIDS among men who have sex with men–United States, 1989-1994. *Morbidity and Mortality Weekly Report, 44,* 401-404.

Chasnoff, I.J., Griffith, D.R., MacGregor, S., Dirkes, K., & Burns, K.A. (1989). Temporal patterns of cocaine use in pregnancy: Perinatal outcome. *Journal of the American Medical Association, 261,* 1741-1744.

Chromy, J.R. (1981). Variance estimators for a sequential sample selection procedure. In D. Krewski, R. Platek, & J.N.K. Rao (Eds.), *Current topics in survey sampling* (pp. 329-347). New York: Academic Press.

Clark, W.B., & Hilton, M.E. (1986). *Changes in American drinking patterns and problems, 1967-1984.* Berkeley, CA: Alcohol Research Group, Medical Research Institute of San Francisco.

Clark, W.B., & Hilton, M.E. (Eds.). (1991). *Alcohol in America: Drinking practices and problems*. Albany, NY: State University of New York Press.

Clark, W.B., & Midanik, L. (1982). Alcohol use and alcohol problems among U.S. adults: Results of the 1979 national survey. In *Alcohol consumption and related problems* (Alcohol and Health Monograph No. 1). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Connolly, G.N., Winn, D.M., Hecht, S.S., Henningfield, J.E., Walker, B., & Hoffman, D. (1986, April 17). The reemergence of smokeless tobacco. *New England Journal of Medicine,* pp. 1020-1064.

Conway, T.L., Trent, L.K., & Conway, S.W. (1989). *Physical readiness and lifestyle habits among U.S. Navy personnel during 1986, 1987, and 1988* (Report No. 89-24). San Diego, CA: Naval Health Research Center.

Dannenberg, A.L., Gielen, A.C., Beilenson, P.L., Wilson, M.H., & Joffe, A. (1993). Bicycle helmet laws and educational campaigns: An evaluation of strategies to increase children's helmet use. *American Journal of Public Health, 83,* 667-674.

Dannenberg, A.L. & Vernick, J.L. (1993). A proposal for the mandatory inclusion of helmets with new children's bicycles. *American Journal of Public Health, 83,* 644-646.

Dawber, T.R. (1980). *The Framingham Study: The epidemiology of atherosclerotic disease.* Cambridge, MA: Harvard University Press.

Department of Defense. (1972, March). Directive No. 1010.2. *Alcohol abuse by personnel of the Department of Defense.* Washington, DC: Author.

Department of Defense. (1980a, August 25). Directive No. 1010.4. *Alcohol and drug abuse by DoD personnel.* Washington, DC: Deputy Secretary of Defense.

Department of Defense. (1980b, December 5). Instruction No. 1010.5. *Education and training in alcohol and drug abuse prevention.* Washington, DC: Author.

Department of Defense. (1985a, March 13). Instruction No. 1010.6. *Rehabilitation and referral services for alcohol and drug abusers.* Washington, DC: Author.

Department of Defense. (1985b, September 23). Directive No. 1010.3. *Drug and alcohol abuse reports.* Washington, DC: Author.

Department of Defense. (1986a, March 11). Directive No. 1010.10. *Health promotion.* Washington, DC: U.S. Department of Defense.

Department of Defense. (1986b). *Smoking and health in the military.* Washington, DC: Author.

Department of Defense. (1991a, March 19). Directive No. 6485.1. *Human immunodeficiency virus-1 (HIV-1).* Washington, DC: Author.

Department of Defense. (1994, March 7). Instruction No. 1010.15. *Smoke-free workplace.* Washington, DC: Author.

Doleschal, E. (1970). Hidden crime. *Crime and Delinquency Literature, 2,* 546-572.

Drizd, T., Dannenberg, A.L., & Engel, A. (1986). *Blood pressure levels in persons 18-74 years of age in 1976-80, and trends in blood pressure from 1960 to 1980 in the United States (Vital and Health Statistics,* Series 11: Data from the National Health and Nutrition Examination Survey, No. 234; DHHS Publication No. PHS 86-1684). Hyattsville, MD: National Center for Health Statistics.

Edmondson, K.S. (1985). Marijuana use: Reproductive, fetal, and neonatal effects. *Neonatal Network: The Journal of Neonatal Nursing, 4*(1), 34-38.

Egendorf, A., Kadushin, C., Laufer, R.S., Rothbart, G., & Sloan, L. (1981). *Legacies of Vietnam: Comparative adjustment of veterans and their peers.* Washington, DC: U.S. Government Printing Office.

Elliott, D., & Huizinga, D. (1984). *The relationship between delinquent behavior and ADM problems* (National Youth Survey Project Report No. 28). Boulder, CO: Behavioral Research Institute.

Erickson, M.L., & Empey, L.T. (1963). Court records, undetected delinquency, and decision-making. *Journal of Criminal Law, Criminology, and Police Science, 54,* 456-469.

Etzion, D. (1984). Moderating effect of social support on the stress-burnout relationship. *Journal of Applied Psychology, 69,* 615-622.

Foa, E.B., Steketee, G., & Olasov Rothbaum, B. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy, 20,* 155-176.

Folkman, S., & Lazarus, R.S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21,* 219-239.

Folkman, S., & Lazarus, R.S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology, 48,* 150-170.

Gibson, H.B., Morrison, S., & West, D.J. (1970). The confession of known offenses in response to a self-reported delinquency schedule. *British Journal of Criminology, 10,* 277-280.

Giovino, G.A., Schooley, M.W., Zhu, B.-P., Chrismon, J.H., Tomar, S.L., Peddicord, J.P., Merritt, R.K., Husten, C.G., & Eriksen, M.P. (1994, November 18). Surveillance for selected tobacco-use behaviors—United States, 1900-1994. *Morbidity and Mortality Weekly Report, 43(SS-3),* 1-43.

Gold, M. (1966). Undetected delinquent behavior. *Journal of Research in Crime and Delinquency, 3,* 27-46.

Gould, L.C. (1969). Who defined delinquency: A comparison of self-reported and officially-reported indices of delinquency for three racial groups. *Journal of Social Problems, 16,* 325-336.

Haberman, P., Josephson, E., Zanes, A., & Elinson, J. (1972). High school drug behavior: A methodological report on pilot studies. In S. Einstein & S. Allen (Eds.), *Proceedings of the First International Conference on Student Drug Surveys.* Farmingdale, NY: Baywood.

Harrison, L.D. (1995). The validity of self-reported data on drug use. *Journal of Drug Issues, 25,* 91-111.

Hindelang, M.J., Hirschi, T., & Weiss, J.G. (1981). *Measuring delinquency.* Beverly Hills, CA: Sage.

Holt, R.R. (1982). Occupational stress. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 419-444). New York: The Free Press.

Institute for Health Policy. (1993). *Substance abuse: The nation's number one health problem: Key indicators for policy* (Report prepared for the Robert Wood Johnson Foundation). Waltham, MA: Brandeis University.

Institute of Medicine. (1995). *Recommendations for research on the health of military women* (Committee on Defense Women's Health Research). Washington, DC: National Academy Press.

Johnston, L.D., & O'Malley, P.M. (1985). Issues of validity and population coverage in student surveys of drug use. In B.A. Rouse, N.J. Kozel, & L.G. Richards (Eds.), *Self-report methods of estimating drug use: Meeting current challenges to validity* (NIDA Research Monograph 57, DHHS Publication No. ADM 85-1402, pp. 31-54). Rockville, MD: National Institute on Drug Abuse.

Johnston, L.D., O'Malley, P.M., & Bachman, J.G. (1994a). *National survey results from the Monitoring the Future study, 1975-1993: Secondary school students* (Vol. I, NIH Publication No. 94-3809). Rockville, MD: National Institute on Drug Abuse.

Johnston, L.D., O'Malley, P.M., & Bachman, J.G. (1994b). *National survey results from the Monitoring the Future study, 1975-1993: College students and young adults* (Vol. II, NIH Publication No. 94-3810). Rockville, MD: National Institute on Drug Abuse.

Kalton, G. (1968). Standardization: A technique to control for extraneous variables. *Applied Statistics, 23*, 118-136.

Kandel, D.B., & Logan, J.A. (1984). Patterns of drug use from adolescence to young adulthood: 1. Periods of risk for initiation, continued use and discontinuation. *American Journal of Public Health, 74*, 660-666.

Kessler, R.C., McGonagle, K.A., Zhao, S., Nelson, C.B., Hughes, M., Eshleman, S., Wittchen, H.-U., & Kendler, K.S. (1994). Lifetime and 12-month prevalence of *DSM-III-R* psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 51,* 8-19.

Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C.B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048-1060.

King, L.A., King, D.W., Fairbank, J.A., Keane, T.M., & Adams, G.A. (1995). *Resilience/recovery factors in posttraumatic stress disorder among female and male Vietnam veterans: Hardiness, postwar social support, and additional stressful life events*. Manuscript submitted for publication.

Kroutil, L.A., Bray, R.M., & Marsden, M.E. (1994). Cigarette smoking in the U.S. military: Findings from the 1992 worldwide survey. *Preventive Medicine, 23,* 521-528.

Kulka, R.A., Schlenger, W.E., Fairbank, J.A., Hough, R.L., Jordan, B.K., Marmar, C.R., & Weiss, D.S. (1990). *Trauma and the Vietnam War generation.* New York: Brunner/Mazel.

Lazarus, R.S. (1966). *Psychological stress and the coping process.* New York: McGraw-Hill.

Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lemmens, P., Tan, E.S., & Knibbe, R.A. (1992). Measuring quantity and frequency of drinking in a general population survey: A comparison of five indices. *Journal of Studies on Alcohol, 53,* 476-486.

Levin, L.I., Peterman, T.A., Renzullo, P.O., Lasley-Bibbs, V., Shu, X., Brundage, J.F., McNeil, J.G., & Seroconversion Risk Factor Study Group. (1995). HIV-1 seroconversion and risk behaviors among young men in the US Army. *American Journal of Public Health, 85*, 1500-1506.

Marsden, M.E., Bray, R.M., Kroutil, L.A., & Wheeless, S.C. (1993, August). *Military and civilian comparisons of substance use*. Paper presented at the 101st Annual Convention of the American Psychological Association, Toronto, Canada.

Mayer, J., & Filstead, W.J. (1979). The adolescent alcohol involvement scale: An instrument for measuring adolescents' use and misuse of alcohol. *Journal of Studies on Alcohol, 40,* 291-300.

McNeil, J.G., Brundage, J.F., Gardner, L.I., Wann, Z.F., Renzullo, P.O., Redfield, R.R., Burke, D.S., Miller, R.N., & US Army Retrovirus Research Group. (1991). Trends of HIV seroconversion among young adults in the US Army, 1985 to 1989. *Journal of the American Medical Association, 265*, 1709-1714.

Midanik, L. (1982). The validity of self-reported alcohol consumption and alcohol problems: A literature review. *British Journal of Addiction, 77,* 357-382.

Midanik, L.T., & Clark, W.B. (1994). The demographic distribution of US drinking patterns in 1990: Description and trends from 1984. *American Journal of Public Health, 84*, 1218-1222.

Moos, R., & Billings, A. (1982). Conceptualizing and measuring coping resources and processes. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 212-230). New York: Macmillan.

Mosher, W.D., & Pratt, W.F. (1993, December 22). *AIDS-related behavior among women 15-44 years of age: United States, 1988 and 1990* (Advance Data No. 239 from *Vital and Health Statistics;* DHHS Publication No. PHS 94-1250). Hyattsville, MD: National Center for Health Statistics.

Mulford, H.A., & Miller, D.A. (1960). Drinking in Iowa: 2. The extent of drinking and selected sociocultural categories. *Quarterly Journal of Studies on Alcohol, 21,* 26-39.

National Center for Health Statistics. (1993). *Health United States, 1992 and Healthy People 2000 review* (DHHS Publication No. PHS 93-1232). Hyattsville, MD: Author.

National Institute on Drug Abuse (Bray, R.M., Visscher, W.A., Kroutil, L.A., Ardini, M.A., & Thornberry, J.P.). (1995). *Prevalence of drug use among DC women delivering livebirths in DC hospitals: 1992* (Technical Report #7 of Washington, DC, Metropolitan Area Drug Study). Rockville, MD: National Institute on Drug Abuse.

Norman, E. (1988). Posttraumatic stress disorder in military nurses who served in Vietnam during the war years 1965-1973. *Military Medicine, 153*, 238-242.

Office of the Assistant Secretary of Defense (Health Affairs). (1992, September 1). *Health status indicators for health promotion and disease prevention: Selected* Healthy People 2000 *objectives for the Department of Defense* [Memorandum]. Washington, DC: Author.

Office on Smoking and Health. (1989). *Reducing the health consequences of smoking: 25 years of progress: A report of the Surgeon General* (DHHS Publication No. CDC 89-8411). Washington, DC: U.S. Department of Health and Human Services.

O'Malley, P.M., Bachman, J.G., & Johnston, L.D. (1983). Reliability and consistency in self-reports of drug use. *International Journal of the Addictions, 18,* 805-824.

Paffenbarger, R.S., Hyde, R.T., Wing, A.L., & Hsieh, C.C. (1986) Physical activity, all-cause mortality, and longevity of college alumni. *New England Journal of Medicine, 314,* 253-287.

Piani, A.L., & Schoenborn, C.A. (1993). *Health promotion and disease prevention: United States, 1990 (Vital and Health Statistics,* Series 10: Data from the National Health Survey, No. 185; DHHS Publication No. PHS 93-1513). Hyattsville, MD: National Center for Health Statistics.

Pianta, R.C., & Egeland, B. (1994). Relation between depressive symptoms and stressful life events in a sample of disadvantaged mothers. *Journal of Consulting and Clinical Psychology, 62,* 1229-1234.

Polich, J.M., & Kaelber, C.T. (1985). Sample surveys and the epidemiology of alcohol ism. In M.A. Schuckit (Ed.), *Alcohol patterns and problems.* New Brunswick, NJ: Rutgers University Press.

Polich, J.M., & Orvis, B.R. (1979). *Alcohol problems: Patterns and prevalence in the U.S. Air Force.* Santa Monica, CA: Rand Corporation.

Public Health Service. (1979). *Healthy people: The Surgeon General's report on health promotion and disease prevention* (DHEW Publication No. PHS 79-55071). Washington, DC: U.S. Department of Health, Education, and Welfare.

Public Health Service. (1980). *Promoting health/preventing disease: Objectives for the nation.* Washington, DC: U.S. Department of Health and Human Services.

Public Health Service. (1991). *Healthy people 2000: National health promotion and disease prevention objectives--full report, with commentary* (DHHS Publication No. PHS 91-50212). Washington, DC: U.S. Department of Health and Human Services.

Regier, D.A., Farmer, M.E., Rae, D.S., Locke, B.Z., Keith, S.J., Judd, L.L., & Goodwin, F.K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: Results from the Epidemiologic Catchment Area (ECA) study. *Journal of the American Medical Association, 264,* 2511-2518.

Regier, D.A., Narrow, W.E., Rae, D.S., Manderscheid, R.W., Locke, B.Z., & Goodwin, F.K. (1993). The de Facto US Mental and Addictive Disorders Service System: Epidemiologic Catchment Area prospective 1-year prevalence rates of disorders and services. *Archives of General Psychiatry, 50,* 85-94.

Rost, K., Burnam, M.A., & Smith, G.R. (1993). Development of screeners for depressive disorders and substance disorder history. *Medical Care, 31,* 189-200.

Rouse, B.A., Kozel, N.J., & Richards, L.G. (Eds.) (1985). *Self-report methods of estimating drug use: Meeting current challenges to validity* (NIDA Research Monograph 57, DHHS Publication No. ADM 85-1402). Rockville, MD: National Institute on Drug Abuse.

Ruch-Ross, H.S. & O'Connor, K.G. (1993). Bicycle helmet counseling by pediatricians: A random national survey. *American Journal of Public Health, 83,* 728-730.

Sacks, J.J., Holmgreen, P., Smith, S.M., & Sosin, D.M. (1991). Bicycle-associated head injuries in the United States from 1984 through 1988. How many are preventable? *Journal of the American Medical Association, 266,* 3016-3018.

Schoenborn, C.A. (1988). *Health promotion and disease prevention: United States, 1985* (*Vital and Health Statistics,* Series 10: Data from the National Health Survey, No. 163; DHHS Publication No. PHS 88-1591). Hyattsville, MD: National Center for Health Statistics.

Schoenborn, C.A., Marsh, S.L, & Hardy, A.M. (1994, February 23). *AIDS knowledge and attitudes for 1992: Data from the National Health Interview Survey* (Advance Data No. 243 from *Vital and Health Statistics).* Hyattsville, MD: National Center for Health Statistics.

Schucker, B., Bailey, K., Heimbach, J.T., Mattson, M.E., Wittes, J.T., Haines, C.M., Gordon, D.J., Cutler, J.A., Keating, V.S., Goor, R.S., & Rifkind, B.M. (1987). Change in public perspective on cholesterol and heart disease. Results from two national surveys. *Journal of the American Medical Association, 258,* 3527-3531.

Siegel, P.Z., Brackbill, R.M., Frazier, E.L., Mariolis, P., Sanderson, L.M., & Waller, M.N. (1991). Behavioral risk factor surveillance, 1986-1990 (In CDC *Surveillance Summaries,* December 1991). *Morbidity and Mortality Weekly Report, 40*(SS-4), 1-23.

Siegel, P.Z., Frazier, E.L., Mariolis, P., Brackbill, R.M., & Smith, C. (1993). Behavioral risk factor surveillance, 1991: Monitoring progress toward the nation's year 2000 health objectives (In CDC *Surveillance Summaries,* August 27, 1993). *Morbidity and Mortality Weekly Report, 42*(SS-4), 1-21.

Siscovick, D.S., LaPorte, R.E., & Newman, J.M. (1985). The disease-specific benefits and risks of physical activity and exercise. *Public Health Reports, 100,* 180-188.

Smith, P.F., Remington, P.L., Williamson, D.F., & Anda, R.F. (1990). A comparison of alcohol sales data with survey data on self-reported alcohol use in 21 states. *American Journal of Public Health, 80,* 309-312.

Sosin, D.M., Sacks, J.J., & Holmgreen, P. (1990). Head injury-associated deaths from motorcycle crashes. *Journal of the American Medical Association, 264,* 2395-2399.

Stanley, J., & Blair, J.D. (Eds.). (1993). *Challenges in military health care: Perspectives on health status and the provision of care.* New Brunswick, NJ: Transaction Publishers.

Substance Abuse and Mental Health Services Administration. (1995a). *National Household Survey on Drug Abuse: Main findings 1993* (DHHS Publication No. SMA 95-3020). Rockville, MD: Author.

Substance Abuse and Mental Health Services Administration. (1995b, September). *Preliminary estimates from the 1994 National Household Survey on Drug Abuse* (Advance Report No. 10). Rockville, MD: Author.

Substance Abuse and Mental Health Services Administration. (1995c). *National Household Survey on Drug Abuse: Population estimates 1994* (DHHS Publication No. SMA 95-3063). Rockville, MD: Author.

Taylor, C.B., Sallis, J.F., & Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public Health Reports, 100,* 195-202.

Thompson, R.S., Rivara, F.P., & Thompson, D.C. (1989). A case-control study of the effectiveness of bicycle safety helmets. *New England Journal of Medicine, 320,* 1361-1367.

University of Michigan. (1994, December 12). *Drug use continues to climb among American teen-agers, as attitudes and beliefs about the dangers of drugs soften, U-M survey says* [Press release]. Ann Arbor, MI: Author.

Williams, J.R., & Gold, M. (1972). From delinquent behavior to official delinquency. *Social Problems, 20,* 209-229.

Woodruff, S.I., & Conway, T.L. (1991). *U.S. Navy health surveillance: Part 1. Feasibility of a health promotion tracking system* (Report No. 91-25). San Diego, CA: Naval Health Research Center.

Woodruff, S.I., & Conway, T.L. (1992). *U.S. Navy health surveillance: Part 2. Responses to a health promotion tracking survey* (Report No. 92-5). San Diego, CA: Naval Health Research Center.

Yankauer, A. (1994). Sexually transmitted diseases: A neglected public health priority. *American Journal of Public Health, 84,* 1894-1897.

APPENDIX A

SAMPLING DESIGN

APPENDIX A
SAMPLING DESIGN

A.1 Design Parameters

The sampling design for the 1995 DoD survey was based on a two-stage probability sample with installations selected at the first stage and personnel assigned to selected installations selected at the second stage. Similar to the designs used for the 1982, 1985, 1988, and 1992 surveys, this approach allowed the sample to be restricted to a predetermined number of installations while preserving the inferential capability of the sample. In addition, we used stratification to further control the sample distribution with respect to organizational and demographic characteristics.

Two factors distinguished the 1995 sampling design from previous designs. The first was the requirement to determine whether the *Healthy People 2000* objectives were being met. Because many of these objectives are gender specific, we stratified the 1995 sample by gender and, as in previous surveys, by pay grade. By stratifying on gender, we selected approximately twice as many women as we did for the 1992 survey.

The second distinguishing factor was the continued reduction in the size of the active-duty force combined with the reassignment of overseas personnel back to the continental United States (CONUS). This ongoing trend resulted in a military presence less worldwide than at any time since the survey series began in 1980. As a result, we modified the sampling design to avoid unnecessary oversampling of overseas personnel. In previous surveys, we controlled the geographic distribution of the sample by forming four geographic cost strata: Americas, North Pacific (including East Asia), Other Pacific, and Europe (including Southwest Asia). We used the following cost strata for the 1995 survey: CONUS, outside the continental United States (OCONUS), and Naval afloat units in CONUS. Naval afloat units were included as a separate cost strata because they require more preparation and coordination during field data collection than shore-based units. These cost strata maintained the global coverage of the sample without requiring unwarranted oversampling.

For consistency across the surveys, the eligible population of 1995 survey participants was defined the same as in previous surveys, namely all active-duty military personnel except recruits, cadets, personnel absent without official leave (AWOL), and personnel who had a permanent change of station (PCS) at the time of data collection. As in previous surveys, we treated *all* nonrespondents who were eligible for the survey (i.e., "excused" and "not excused") as eligible for the nonresponse follow-up. We followed this approach both for consistency across surveys and because we believed it essential to determine whether prevalence rates and health behaviors changed when personnel were

away from their home stations. If such changes had occurred and we had not included them in our estimates, our results could have been noticeably biased. In addition, ignoring these nonrespondents could have had a differential effect on Service-level estimates because the availability of Navy and Marine Corps personnel has been consistently lower than for the Army and the Air Force during the survey series.

We used the precision levels of prior DoD surveys in this series as a guide for the 1995 survey. In Table A.1, we present the key prevalence rates and their associated standard errors that we used in planning the 1995 survey. Data were drawn from the 1992 survey. These estimates include any drug use, heavy drinking in the past 30 days, and any smoking in the past 30 days for the reporting domains of Service, pay grade, and gender. The sampling design for the 1995 survey was designed to estimate these population parameters with a standard error less than or equal to the standard error obtained by the 1992 survey.

Other parameters could have been used to assist in specifying the sampling design, including many of the baseline parameters for the *Healthy People 2000* objectives. Previous DoD surveys provided estimates for some of these behaviors, and it appeared that a survey of the Military large enough to provide estimates of substance use would also be able to provide reliable estimates of many of the health-related behaviors (e.g., smokeless tobacco use by males aged 24 or younger, or proportions for sexually active unmarried personnel). We expect these design objectives will yield acceptable precision for the various baseline estimates to be established for comparison in later years for measuring the Military's success in meeting *Healthy People 2000* objectives.

A.2 First-Stage Sampling Frame Construction and Stratification

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

We obtained personnel counts from the 30 September 1994 version of the *Active Duty Military Master Personnel File* maintained by the Defense Manpower Data Center (DMDC) for use as the data source for construction of the first-stage frame. Recruits were excluded from the eligible survey population by restricting the counts to personnel with fewer than 12 months of service. This was done so that basic training centers were not overrepresented on the first-stage frame. Personnel with fewer than 12 months service who were not recruits were eligible and were listed on the second-stage sampling frame.

Table A.1 Population Parameters Used as the Basis for the Sampling Design

Response Variable	Reporting Domain	1992 Survey Estimate	1992 Survey Standard Error	Standard Error Used as Basis of 1995 Design
Any Illicit Drug Use, Past 30 Days	Army	3.9	0.77	0.77
	Navy	4.0	0.94	0.80
	Marine Corps	5.6	0.99	0.80
	Air Force	1.2	0.18	0.18
	E1-E3	9.2	1.71	1.00
	O1-O3	0.6	0.22	0.22
Heavy Alcohol Use, Past 30 Days	Army	17.2	1.46	1.46
	Navy	13.8	1.40	1.40
	Marine Corps	25.5	1.19	1.19
	Air Force	10.7	0.80	0.80
	E1-E3	28.2	2.21	0.80
	E4-E6	15.2	0.62	0.62
	E7-E9	9.0	0.45	0.45
	W1-W5	10.1	1.27	1.27
	O1-O3	5.5	0.81	0.81
	O4-O10	2.5	0.66	0.66
	Male	17.1	0.72	0.72
	Army, Female	4.0	1.17	1.00
	Navy, Female	4.6	1.35	1.00
	Marine, Female	10.0	4.26	3.00
	Air Force, Female	4.1	0.99	0.99
Any Smoking, Past 30 Days	Army	37.0	2.01	2.01
	Navy	37.1	1.71	1.71
	Marine Corps	39.2	2.28	2.00
	Air Force	29.2	1.38	1.38
	E1-E3	43.4	1.29	1.00
	E4-E6	38.0	0.99	0.99
	E7-E9	38.4	0.88	0.88
	W1-W5	26.8	1.88	1.88
	O1-O3	11.8	1.04	1.04
	O4-O10	12.3	0.75	0.75
	Male	35.7	1.01	1.01
	Army, Female	29.8	3.40	2.00
	Navy, Female	35.0	2.64	2.00
	Marine, Female	47.0	7.42	2.45
	Air Force, Female	26.9	3.68	2.00

Source: 1992 DoD Survey of Health Related Behaviors Among Military Personnel.

We defined FSUs on the basis of Unit Identification Codes (UICs) or Reporting Unit Codes (RUCs), and five-digit ZIP Codes in CONUS or Army post office/Fleet post office (APO/FPO) numbers overseas. We used Navy geolocation codes to identify the home ports of all afloat units. The use of geolocation codes enabled us to form clusters of afloat units with the same or geographically proximal home ports. 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 personnel. Afloat units were required to have at least 1,000 available personnel. These sites were designated as "nucleus sites." All other sites (designated as "satellite sites") were associated with the closest nucleus site. The minimum size requirements for nucleus sites (shown in Table A.2) were based on the rates at which 1992 sampled personnel were available for group session questionnaire administrations.

Table A.2 Size Requirements for Nucleus Sites

Military Service	Minimum	Maximum	
		Personnel	UICs
Army	417	3,621	48
Navy[a]	476	1,942	34
Marine Corps	437	3,722	28
Air Force	390	3,327	40

UIC = Unit Identification Code.

[a]Navy afloat units were required to have a minimum of 1,000 personnel to be considered a nucleus site; no subdividing of large first-stage sampling units was done for Navy afloat units.

We constructed Army and Air Force 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 United States and by the APO number otherwise. As shown in Table A.3, the Army first-stage sampling frame had 201 FSUs and accounted for 478,049 of the 478,171 Army personnel with 12 or more months of service on the 30 September 1994 active-duty personnel file provided by the DMDC. The Air Force first-stage sampling frame had 142 FSUs and accounted for 386,562 of the 390,019 Air Force personnel with 12 or months of service on the DMDC file. Personnel not accounted for on the sampling frame had missing or unusable ZIP/APO numbers.

Table A.3 1995 First-Stage Stratum, Population Sizes, and Sample Sizes

First-Stage Stratum		First-Stage Units		Personnel	
Cost Region	Service	Frame	Sample	Frame[a]	Expected Respondents
CONUS	Army	124	14	340,190	3,824
	Navy, Afloat	56	4	154,842	1,529
	Navy, Ashore	109	8	196,367	2,495
	Marine Corps	33	11	115,555	3,255
	Air Force	107	11	300,986	3,932
	Total	429	48	1,107,940	15,035
OCONUS	Army	77	4	137,859	1,488
	Navy	34	2	65,094	687
	Marine Corps	17	2	30,010	753
	Air Force	35	3	85,576	1,053
	Total	163	11	318,539	3,981
Total	Army	201	18	478,049	5,312
	Navy	199	14	416,303	4,712
	Marine Corps	50	13	145,565	4,008
	Air Force	142	14	386,562	4,985
	Total	592	59	1,426,479	19,017

[a]Active-duty personnel with 12 or more months of service as shown by Defense Manpower Data Center (DMDC) *Active Duty Military Master Personnel Data File,* 30 September 1994.

Source: 1995 DoD Survey of Health Related Behaviors Among Military Personnel.

Marine Corps FSUs were constructed from organizational units identified by the RUC. We determined the geographic location of an ashore unit by its ZIP code or FPO code. We identified afloat units by FPO numbers assigned to ships and used the State or country of the unit's home port as the geographic location. The Marine Corps first-stage frame had 50 FSUs and accounted for 145,565 of the 146,317 personnel on the DMDC file.

Navy FSUs were constructed by 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 United States and by its FPO number otherwise. We identified afloat units by FPO numbers assigned to ships and used the geolocation code of the afloat unit to determine its home port. As shown in Table A.3, the Navy first-stage frame contained 199 FSUs and accounted for 416,303 of the 416,385 Navy personnel on the DMDC file.

In addition to Service, the frame was stratified by CONUS/OCONUS geographic regions. For the Navy in CONUS, the frame was stratified by afloat versus ashore. Table A.3 shows the first-stage sampling information for the 1995 survey. The geographic strata were imposed to control the worldwide distribution of the sample, which was an important cost consideration.

A.3 Second-Stage Sampling Frame

Second-stage sampling units (SSUs) are, ideally, the individual active-duty personnel within each of the first-stage units. The fact that the frame information supplied by the Services was necessarily not fully current at the time of data collection introduced an additional step to identify sample individuals.

At the time the sample was selected, we knew the numbers of individuals in each of the pay grade-gender groups in each of the FSUs. Each name could be uniquely associated with a line on the roster (the order used to list the names was of no consequence). Then an equal probability, without replacement sample of individuals could be selected by choosing either names or alternatively lines on the roster.

By defining SSUs to be lines on the roster, we provided a mechanism to fully account for any personnel changes taking place between the times of sample selection and data collection at a sampled FSU. At the time the sample was selected, we numbered positions on a conceptual roster and selected a random sample of line numbers. During data collection, we identified the individuals named on the sample line numbers as applied to the actual roster. If a decrease in the personnel complement occurred since the sample was selected, some of the sample line numbers may have been empty. An increase in personnel was accommodated by considering the roster to be circular, thereby allowing more than one individual to correspond to the same sample line number. We

used these procedures successfully in the 1982, 1985, 1988, and 1992 surveys, demonstrating their operational practicality.

We stratified the second-stage frame by pay grade group (E1 to E3, E4 to E6, E7 to E9, W1 to W5, O1 to O3, O4 to O10) and by gender. The second-stage stratification was needed to control the distribution of the sample by pay grades and gender to meet the precision requirements specified in Table A.1.

A.4 Sample Allocation and Selection

We used estimates from the 1992 survey along with population counts from the 1995 frame (summarized in Table A.3) for determining the sample allocation. Equations were developed that describe the variable survey cost and sampling variances in terms of the various features of the design, the first- and second-stage sample sizes, and the nonresponse follow-up. Then the minimum cost allocations were obtained by solving the equations simultaneously subject to the precision constraints.

We selected approximately 442 individuals per FSU. Pay grade groups were disproportionately sampled; officer grades were generally oversampled relative to the enlisted grades, reflecting the generally smaller drug and alcohol use domains in the former (thus requiring a larger sample size for comparable levels of precision). Females were also oversampled so that precision is increased for this domain relative to the precision obtained in earlier surveys.

We constructed composite size measures for selecting the first-stage sample and for determining the second-stage sample size in each of the 59 FSUs by using the number of personnel in each pay grade group in each FSU. Notationally, first-stage strata were denoted by $a = 1, 2, ..., 9$. 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.3 (presented earlier).

Second-stage strata were identified by the subscript $b = 1, 2, ..., 12$. SSUs in each of the gender and 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. We let:

$\pi(a,i)$ = expected frequency of selecting the i-th FSU from the a-th stratum in samples of size $n_1(a)$, and

$\pi(j \mid a,i,b)$ = expected frequency of selecting the j-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,

$$\pi(a,i) = n_1(a) \cdot \frac{S(a,i)}{S(a)}$$

where

$$S(a) = \sum_{i \in a} S(a,i),$$

and

$$\pi(j \mid a,i,b) = \frac{n_2(a,i,b)}{N_2(a,i,b)}, \; j = 1, 2, \ldots, N_2(a,i,b).$$

Computing the composite size measures is equivalent to finding values $S(a,i)$ and $n_2(a,i,b)$, such that

$$\begin{aligned} \pi(a,i,b,j) &= \pi(a,i) \cdot \pi(j \mid a,i,b) \\ &= K(a,b), \end{aligned}$$

a constant within values of the a-subscript and the b-subscript. The solutions are given by:

$$S(a,i) = \sum_{b=1}^{12} f(a,b) \cdot N_2(a,i,b)$$

and

$$n_2(a,i,b) = \frac{n_2(a) f(a,i) N_2(a,i,b)}{S(a,i)},$$

where

$f(a,b)$ = 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

$n_2(a)$ = targeted second-stage sample size in the a-th first-stage stratum.

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 units' 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 differed by less than one.

We also controlled the distribution of sampled FSUs across major commands by using a sequential selection algorithm from a controlled ordering of the sampling frame. The selection procedure was applied within each stratum and began by picking an FSU at random with probability $\pi(a,i)$. Given a random starting point, selections proceeded sequentially in a circular fashion through the frame until the starting point was again reached. 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.

Sequential selection from an ordered frame allowed us to control the distribution of sampled 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, we selected sampled individuals with equal probability and without replacement from among the total personnel in the gender-pay grade group at the time of data collection. Sampled personnel not attending the group administrations were candidates for the nonresponse follow-up. The randomization procedure produced a self-weighting sample of individuals within gender and pay grade groups and first-stage strata. We present details of the calculation of sampling weights in Appendix B.

Reference for Appendix A

Chromy, J.C. (1981). Variance estimators for a sequential sample selection procedure. In D. Krewski, R. Platek, & J.N.K. Rao (Eds.), *Current topics in survey sampling* (pp. 329-347). New York: Academic Press.

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 sampling weights to sampled members to reflect differences in sample selection rates, survey eligibility rates, and response rates.

B.1.1 Initial Sample Weights

We calculated initial sample weights as the inverse of the probability of selection at each stage of the design. At the first stage, the expected frequency of selecting the ***i*-th** first-stage sampling unit (FSU) from the ***a*-th** first-stage stratum was

$$\pi(a,i) = n_1(a) \bullet S(a,i) \,/\, S(a),$$

where

$n_1(a)$ = number of FSUs selected from the ***a*-th** stratum,

$S(a,i)$ = composite size measure assigned to the ***i*-th** FSU, and

$S(a)$ = sum of the composite size measures in the ***a*-th** stratum.

At the second stage, we selected simple random samples of personnel from each gender and pay grade group with sampling rates that attained the desired stratum sizes, and we made the overall selection probabilities assigned to personnel in the same first- and second-stage strata equal whenever possible. The probability of selecting the ***j*-th** person from the ***b*-th** gender and pay grade stratum conditional on the selection of the ***i*-th** FSU from the ***a*-th** first-stage stratum was

$$\pi(j \mid a,i,b) = Min[1, n_2(a,b) \,/\, N(a,i,b)] \,,$$

where

$N(a,i,b)$ = total number of personnel in the ***b*-th** gender and pay grade second-stage stratum of the ***i*-th** FSU from the ***a*-th** first-stage stratum, and

$n_2(a,b)$ = targeted second-stage sample size for the ***b*-th** gender and pay grade second-stage 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** gender and pay grade second-stage stratum of the ***i*-th** FSU was

$$w(a,i,b,j) = [\pi(a,i) \bullet \pi(j \mid a,i,b)]^{-1} .$$

We assigned this initial sampling weight to each of the 27,141 personnel selected for the sample.

B.1.2 Adjustments for Survey Eligibility

As in previous surveys in this series, the 1995 DoD survey population comprised all military personnel on active duty at the time we selected the sample (February and March 1995) and who were still on active duty when we conducted the survey (April to August 1995). The only exceptions were

- basic trainees,
- Service academy cadets and midshipmen,
- personnel undergoing a permanent change of station (PCS), and
- personnel absent without official leave (AWOL).

We excluded basic trainees, academy cadets, and midshipmen because of their lack of military experience. We excluded personnel who were either undergoing a PCS or were AWOL because of the difficulties associated with contacting them during the relatively short data collection period.

During the group administrations (Phase 1) of the survey questionnaire, we determined the eligibility status of all 27,141 sampled members. We considered the 3,891 personnel who had left active duty, were PCS, or were AWOL to be ineligible for the survey. We considered personnel who were deployed, ill, on leave, or on temporary duty to be eligible but unavailable for the survey. We also considered eligible personnel who were available but did not attend the group administrations. To give all eligible sampled members an opportunity to participate in the survey, we mailed questionnaires (Phase 2) to all eligible personnel not attending the group administrations.

We could not determine the exact size of the survey population (i.e., the total number of personnel eligible for the survey) because of the ever-changing assignment status of military personnel. Instead, we applied the observed eligibility rates for sampled members to the June 1995 personnel counts provided by the Defense Manpower Data Center (DMDC) to obtain accurate estimates of the total number of eligible personnel in each of the 108 sampling strata defined by intersection of Service, region, gender, and pay grade group. To ensure stable sampling estimates, we collapsed 24 sampling strata with fewer than 30 respondents to form 84 post-strata. When it was necessary to combine

strata due to small sample sizes, collapsing was first done across regions. Next, warrant officers were combined with 01s to 03s. Then we applied the observed eligibility rate for each post-stratum to the corresponding personnel count to obtain the estimated number of eligible personnel.

We estimated the number of eligible personnel in each post-stratum as follows. First, we defined the following eligibility indicator for the ***j*-th** sampled member in the ***b*-th** pay grade group in the ***i*-th** FSU of the ***a*-th** first-stage stratum:

$$e(a,i,b,j) = \begin{cases} 1 & \textit{if he/she was eligible for the survey, and} \\ 0 & \textit{otherwise.} \end{cases}$$

We set this indicator to 1 for the 23,250 sampled members whom we classified as eligible for the survey. Then, we estimated the number of eligible personnel in each post-stratum ***c*** as:

$$\hat{N}_e(c) = \frac{\sum_{a,b\in c} \sum_{i\in a} \sum_{j\in b} w(a,i,b,j) \bullet e(a,i,b,j)}{\sum_{a,b\in c} \sum_{i\in a} \sum_{j\in b} w(a,i,b,j)} \bullet N(c),$$

where

$N(c)$ = the June 1995 personnel count for post-stratum ***c***.

Table B.1 compares these estimates to the entire active-duty population by Service, gender, and pay grade group. In the next section, we describe how we adjusted the initial sampling weights of survey participants so that the sum of their adjusted weights within a post-stratum equaled the estimated number of eligible personnel in the post-stratum.

B.1.3 Adjustments for Nonresponse

We considered a sampled 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:

$$r(a,i,b,j) = \begin{cases} 1 & \textit{if he/she provided a usable questionnaire, and} \\ 0 & \textit{otherwise.} \end{cases}$$

We set this indicator to 1 for the 16,193 sampled members who provided a usable questionnaire.

To force the sum of the adjusted weights of respondents to equal the estimated number of eligible personnel, we calculated the following adjustment factor for each post-stratum ***c*:**

Table B.1 Comparison of Total Personnel and Eligible Personnel

Pay Grade/ Gender	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-E3										
Male	85,942	74,896 (11,915)	76,324	68,705 (11,107)	62,654	51,849 (7,841)	50,924	49,777 (4,604)	275,844	245,227 (18,655)
Female	15,977	13,356 (1,973)	15,800	13,535 (2,784)	2,870	2,380 (325)	14,116	13,755 (1,137)	48,763	43,026 (3,611)
E4-E6										
Male	236,861	190,109 (22,158)	207,493	191,861 (22,324)	62,822	59,582 (3,626)	174,588	166,879 (10,305)	681,764	608,431 (33,297)
Female	36,477	29,227 (2,992)	22,843	20,717 (2,823)	3,506	3,321 (432)	31,498	30,142 (3,334)	94,324	83,407 (5,312)
E7-E9										
Male	50,922	42,170 (3,358)	37,390	34,923 (3,060)	12,676	12,309 (1,397)	39,137	37,896 (2,070)	140,125	127,029 (5,184)
Female	5,114	4,209 (686)	2,418	2,259 (254)	549	528 (119)	4,366	4,349 (694)	12,447	11,344 (1,015)
W1-W5										
Male	11,913	9,248 (2,074)	2,326	2,046 (366)	1,814	1,755 (209)	0	0 (0)	16,053	13,049 (2,116)
Female	600	354 (101)	131	186 (110)	125	87 (20)	0	0 (0)	856	627 (150)
O1-O3										
Male	36,524	28,226 (3,476)	30,299	24,955 (2,923)	10,136	8,418 (1,096)	38,736	36,062 (8,905)	115,695	97,662 (10,056)
Female	7,088	5,542 (1,128)	5,172	4,156 (1,184)	370	276 (103)	8,359	7,927 (2,326)	20,989	17,902 (2,846)
O4-O10										
Male	25,146	22,106 (5,047)	19,575	16,533 (3,315)	5,151	4,935 (1,046)	27,625	25,526 (5,336)	77,497	69,099 (8,125)
Female	3,204	2,803 (861)	2,575	2,140 (642)	155	149 (47)	3,740	3,501 (1,337)	9,674	8,593 (1,716)
Total	515,768	422,246 (29,498)	422,346	382,017 (29,367)	162,828	145,319 (7,927)	393,089	375,814 (17,122)	1,494,031	1,325,396 (45,701)

Note: Total personnel is the number of personnel, excluding cadets, midshipmen, and basic trainees, who were on active duty as of June 30, 1995. Eligible personnel is the estimated number of these personnel who had some chance of being selected for the survey. The standard errors for the estimated number of eligible personnel are given in parentheses beneath the estimates.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

$$A(c) = \frac{\hat{N}_e(c)}{\sum_{a,b \in c} \sum_{i \in a} \sum_{j \in b} w(a,i,b,j) \bullet r(a,i,b,j)}$$

Then we applied the adjustment factor to the initial sampling weight of each respondent to obtain the following adjusted weight:

$$w^*(a,i,b,j) = A(c) \bullet w(a,i,b,j) \bullet r(a,i,b,j).$$

Nonzero values of this weight were assigned to the 16,193 respondents who provided questionnaires with usable information.

B.2 Estimation

In this section, we discuss the statistical estimation procedures we used for the complex sample design of the 1995 survey. We produced estimates for different reporting domains, such as demographic groups defined by 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 the change in the percentage of persons reporting drug use between 1992 and 1995. In addition, we fit logistic regression models to estimate the combined effect of sociodemographic 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 (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, 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.

B.2.1 Estimate of Population Totals

In this section, response or observation variables (which are questionnaire items or quantities recoded from questionnaire items) are denoted by Y, and the values obtained for the response variables for the j-th person from the b-th second-stage stratum of the r-th FSU in the a-th first-stage stratum are denoted by $y(a,i,b,j)$.

A population total is estimated by the quantity,

$$\hat{Y} = \sum_{a=1}^{9} \sum_{i=1}^{n_1(a)} \sum_{b=1}^{12} \sum_{j=1}^{n_2(a,i,b)} w^*(a,i,b,j) \bullet y(a,i,b,j) \tag{1}$$

where

$n_1(a)$	=	number of FSUs selected from the a-th stratum,
$n_2(a,i,b)$	=	number of responding personnel in the b-th second-stage stratum of the i-th FSU in the a-th first stage stratum,
$w^*(a,i,b,j)$	=	final adjusted sampling weight (described in Section B.1), and
$y(a,i,b,j)$	=	response obtained for the j-th respondent in the b-th second stratum of the i-th FSU in the a-th first-stage stratum.

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:

$$\hat{Y}(a,i) = \sum_{b=1}^{12} \sum_{j=1}^{n_2(a,i,b)} w^*(a,i,b,j) \bullet y(a,i,b,j) \tag{2}$$

Then Equation (1) can be rewritten as:

$$\hat{Y} = \sum_{a=1}^{9} \sum_{i=1}^{n_1(a)} \hat{Y}(a,i),$$

and the sampling variance, assuming sampling with replacement at the first stage of the design, is estimated by:

$$\hat{Var}\{\hat{Y}\} = \sum_{a=1}^{9} \frac{n_1(a)}{n_1(a)-1} \sum_{i=1}^{n_1(a)} \left[\hat{Y}(a,i) - \hat{\bar{Y}}(a)\right]^2, \tag{3}$$

where

$$\hat{\bar{Y}}(a) = \frac{1}{n_1(a)} \sum_{i=1}^{n_1(a)} \hat{Y}(a,i).$$

B.2.2 Estimates of Population Proportions

Estimates of population proportions take the form of (combined) ratio estimates, denoted in general by:

$$\hat{R} = \frac{\hat{Y}}{\hat{X}}.$$

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. Because 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 (e.g., see Cochran, 1977).

The variance of the estimator can be approximated using a Taylor series linearization. The linearized response variable value,

$$z(a,i,b,j) = y(a,i,b,j) - \hat{R}\, x(a,i,b,j) \tag{4}$$

is computed and used in place of the y-values in Equation (2). The variance estimate is then computed as given in Equation (3). Here, $y(a,i,b,j)$ and $x(a,i,b,j)$ denote the responses to two different observation variables of the j-th person in the b-th second-stage stratum of the i-th FSU in the a-th first-stage stratum.

B.2.3 Domain Estimates

Membership of a sampled 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 sampled individual (in the b-th gender/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, $\delta(a,i,b,j)$ and $y(a,i,b,j)$, 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:

$$Var\{\hat{\theta}_1 - \hat{\theta}_2\} = Var\{\hat{\theta}_1\} + Var\{\hat{\theta}_2\} - 2\ Cov\ \{\theta_1, \theta_2\},$$

where $\hat{\theta}_1$ and $\hat{\theta}_2$ denote the two domain estimates. In terms of the previous formulas, the first-stage level differences,

$$\hat{D}(a,i) = \hat{Y}_1(a,i) - \hat{Y}_2(a,i),\ i = 1, 2, ..., n_1(a),$$

$$a = 1,2,.., 9,$$

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,

$$t^* = \frac{\hat{\theta}_1 - \hat{\theta}_2}{[Var\ \{\hat{\theta}_1 - \hat{\theta}_2\}]^{1/2}}$$

could be used with 50 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 Equations (3) and (4).

B.3 Analysis Software

For producing the estimates, we used SUDAAN (SUrvey DAta ANalysis), a software package developed at the Research Triangle Institute for the specific purpose of analyzing data from complex surveys (Shah, Barnwell, & Bieler, 1995). 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 1995 DoD 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.

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 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).

References for Appendix B

Binder, D. A. (1981). On the variances of asymptotically normal estimators for complex surveys. *Survey Methodology, 7*(2), 157-170.

Cochran, W.G. (1977). *Sampling techniques* (3rd ed). New York: John Wiley & Sons.

Shah, B.V., Holt, M.M., & Folsom, R.E. (1977). *Inference about regression models from sample survey data.* Invited paper for the International Association of Survey Statisticians, Third Annual Meeting, New Delhi, India, December.

Shah, B.V., Barnwell, B.G., & Bieler, G.S. (1995). *SUDAAN user's manual: Software for the analysis of correlated data: Release 6.40.* Research Triangle Park, NC: Research Triangle Institute.

Woodruff, R.S. (1971). Simple method for approximating variance of a complicated estimate. *Journal of the American Statistical Association, 66,* 411-414.

APPENDIX C

ESTIMATED SAMPLING ERRORS

APPENDIX C

ESTIMATED SAMPLING ERRORS

The procedures and methodology used for the 1995 DoD survey are described here to help the reader use the estimates of sampling errors that were calculated and printed for various proportions and means in this report. "Sampling errors" is the general term we 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. At the time of data collection for the 1995 survey, over 1.5 million officers and enlisted personnel in the four Services were on active duty worldwide. Samples of 16,193 such military personnel clustered in 59 central installations provided 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.

C.1 Confidence Intervals and Significant Differences

For any particular percentage resulting from a sampling survey, it is not possible to know the exact amount of error that has resulted from sampling. It is possible, however, to establish estimated "confidence intervals" (i.e., ranges very likely to include the true population value). For example, Table 3.1 shows that 21.1% of the military personnel in the 1995 sample reported that they did not consume any alcohol in the past 30 days with a standard error of 0.5%. It is possible to set up a 95% confidence interval, which means that 95% of the time a computed interval can be expected to include the true (population) percentage. As a general rule, the 95% confidence interval is formed by doubling the standard error (multiplying by 1.96 is the precise value to use), adding this result to the estimate to form the upper bound, and subtracting it from the estimate to form the lower bound. In this case, the lower and upper limits of the 95% interval are 20.1% and 22.1%. 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 1992 and 1995 in the percentages of all military personnel whom we classified as abstainers as 0.7% (Table 3.1), and we have computed the 95% confidence limits for that difference as $\pm$1.8% of that estimate. In other words, we can be 95% certain that the true difference between the 2 years' populations is somewhere between 1.8% below the estimated difference and 1.8% above it. Because that range includes zero difference between the two survey years, at the 95% level the estimated difference is not significantly different

from zero, or just "not significant." If the interval had been smaller, the difference would have been "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, all things being equal, have a confidence interval just half as wide as that for a sample of 100, because $1/\sqrt{400}$ is just about half of $1/\sqrt{100}$.

C.2.2 Percentage Size

Other things again being equal, percentage values around 50% have the largest confidence intervals because $\sqrt{p(1-p)}$ (where p is a proportion between 0.0 and 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% because $\sqrt{.1 \times .9}$ 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 the effects of clustering and weighting reduce it. 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) defined a correction term known as the design effect (***DEFF***), where

$$DEFF = \frac{\textit{Actual sampling variance}}{\textit{SRS variance}} .$$

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 expressed as means (e.g., average ounces of ethanol), 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 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

$$RSE\ [-ln(p)] > 0.225 \text{ for } p \leq 0.5, \text{ and}$$

$$RSE\ [-ln(1-p)] > 0.225 \text{ for } p > 0.5.$$

Note that $RSE[-ln(p)] = RSE(p)/(-ln(p)) = SE(p)/(-p\ ln(p))$, where $SE(p)$ denotes the standard error of p, the estimated proportion.

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 very lax requirement on large proportions. That is, small proportions must have relatively large effective sample sizes to avoid being suppressed, whereas large proportions require much smaller sample sizes.

The rule based on the natural log of the ***RSE*** of the estimate is more liberal in allowing small proportions to avoid being suppressed but more stringent with regard to suppression of large proportions. For example, under the rule based on the $RSE[-ln(p)]$, percentages of about 1% would be suppressed unless they were based on an effective sample size of about 100 or more respondents, and percentages of 20% would be suppressed unless they were based on an effective sample size of about 30 respondents. Using a rule for proportions based on $RSE(p) > 0.50$ would require an effective sample size of 400 respondents for percentages of about 1% and an effective sample size of only 16 respondents for percentage estimates of about 20%.

Very small estimates (i.e., < 0.05%) that were not suppressed under these rules, but that rounded to zero, were also suppressed and are shown as two asterisks (**) in the tables and figures.

Reference for Appendix C

Kish, L. (1965). *Survey sampling*. New York: John Wiley & Sons.

APPENDIX D

SUPPLEMENTAL TABLES

Table D.1 Substance Use Summary for the Army, 1980-1995

Measure	Year of Survey											
	1980		1982		1985		1988		1992		1995	
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]	21.1	(1.0)[c]
Infrequent/light	12.2	(0.9)	16.7	(1.0)[b]	16.6	(1.1)	16.8	(0.9)	17.6	(0.5)	18.1	(1.4)[c]
Moderate	19.9	(1.2)	16.6	(0.8)[b]	17.6	(0.7)	19.5	(0.8)	17.2	(0.8)[b]	18.1	(0.9)
Moderate/heavy	32.0	(0.7)	30.3	(1.0)	25.6	(1.8)[b]	27.1	(0.8)	26.2	(1.4)	24.7	(1.0)[c]
Heavy	20.3	(1.6)	24.7	(1.4)[b]	25.2	(2.2)	19.5	(1.1)[b]	17.2	(1.5)	18.0	(1.8)
Any Drug Use[a]												
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]	4.0	(0.9)[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]	9.2	(1.1)[c]
Cigarette Use, Past 30 Days												
Any smoking	54.3	(0.7)	54.7	(1.8)	52.0	(1.8)	43.1	(1.1)	37.0	(2.0)[b]	34.1	(1.6)[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]	17.0	(1.0)
Alcohol Use Negative Effects												
Serious consequences	17.9	(1.6)	16.3	(1.2)	13.5	(2.0)	10.3	(0.8)	8.3	(1.2)	7.9	(0.9)[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]	16.5	(1.5)[c]
Dependence	8.8	(1.0)	10.1	(0.8)	12.1	(1.5)	7.2	(0.6)[b]	5.4	(0.7)	6.4	(0.9)

Note: Entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol are reported for the past 12 months.

[a]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, 1992, and 1995.

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980-1995.

Table D.2 Substance Use Summary for the Navy, 1980-1995

Measure	Year of Survey											
	1980		1982		1985		1988		1992		1995	
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)	19.4	(0.9)[c]
Infrequent/light	11.7	(0.6)	20.7	(2.3)[b]	18.8	(2.0)	18.3	(0.9)	19.0	(1.1)	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)	19.0	(1.0)
Moderate/heavy	32.2	(1.6)	26.1	(1.5)[b]	27.9	(1.4)	30.5	(1.6)	26.9	(0.7)[b]	23.8	(1.6)[c]
Heavy	25.6	(2.3)	27.7	(2.9)	24.9	(1.4)	14.6	(2.1)[b]	13.8	(1.4)	18.8	(1.4)[b,c]
Any Drug Use[a]												
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)	3.6	(0.6)[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)	7.3	(0.8)[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]	34.9	(1.6)[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]	16.3	(1.4)[b,c]
Alcohol Use Negative Effects												
Serious consequences	22.1	(2.1)	17.6	(1.4)	13.5	(2.0)	10.4	(1.5)	9.1	(3.9)	8.6	(0.9)[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)	20.1	(1.9)[c]
Dependence	9.7	(1.0)	11.6	(1.0)	6.8	(0.8)[b]	7.2	(1.3)	5.2	(1.0)	6.1	(0.8)[c]

Note: Entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol are reported for the past 12 months.

[a]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, 1992, and 1995.

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980-1995.

Table D.3 Substance Use Summary for the Marine Corps, 1980-1995

Measure	Year of Survey											
	1980		1982		1985		1988		1992		1995	
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]	16.9	(0.7)[c]
Infrequent/light	11.0	(0.5)	13.2	(1.8)	13.6	(1.7)	15.9	(3.2)	15.2	(1.2)	14.2	(0.6)[c]
Moderate	17.6	(1.2)	14.9	(0.3)[b]	15.1	(2.1)	14.0	(1.1)	19.2	(1.4)[b]	17.4	(1.1)
Moderate/heavy	32.3	(1.4)	27.8	(0.7)	31.1	(1.8)	28.2	(1.7)	25.0	(1.8)	23.6	(1.0)[c]
Heavy	28.6	(2.5)	30.6	(0.9)	29.4	(3.7)	23.9	(3.9)	25.5	(1.2)	27.8	(2.4)
Any Drug Use[a]												
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)	3.6	(0.8)[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)	7.3	(1.2)[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)	35.0	(1.8)[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)	15.0	(1.2)[b,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)	15.7	(1.8)	14.7	(1.6)[c]
Productivity loss	34.1	(1.6)	37.6	(1.2)	29.0	(5.0)	32.0	(3.8)	25.6	(1.9)	21.8	(1.9)[c]
Dependence	11.8	(1.2)	10.2	(1.8)	7.6	(1.4)	9.8	(1.7)	11.2	(1.7)	9.6	(1.1)

Note: Entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol are reported for the past 12 months.

[a]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, 1992, and 1995.

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980-1995.

Table D.4 Substance Use Summary for the Air Force, 1980-1995

Measure	Year of Survey											
	1980		1982		1985		1988		1992		1995	
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]	24.4	(0.9)[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]	20.5	(0.9)[c]
Moderate	24.9	(1.2)	19.8	(0.7)[b]	20.8	(1.2)	19.7	(0.8)	21.3	(0.7)	20.5	(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]	24.3	(1.0)[c]
Heavy	14.3	(1.4)	17.7	(1.2)	16.4	(1.4)	14.5	(1.0)	10.7	(0.8)[b]	10.3	(1.1)[c]
Any Drug Use[a]												
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]	1.0	(0.2)[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]	2.5	(0.4)[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]	25.1	(1.3)[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]	11.2	(0.8)[b,c]
Alcohol Use Negative Effects												
Serious consequences	9.0	(0.8)	8.0	(0.8)	4.7	(0.5)	3.9	(0.5)	3.8	(0.4)	3.7	(0.5)[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]	9.9	(0.6)[c]
Dependence	4.3	(0.6)	3.7	(0.7)	3.3	(0.5)	3.8	(0.4)	2.7	(0.3)[b]	3.0	(0.6)

Note: Entries are expressed as percentages (with standard errors in parentheses). Serious consequences for alcohol are reported for the past 12 months.

[a]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, 1992, and 1995.

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

[c]Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1980-1995.

Table D.5 Heavy Alcohol Use, by Sociodemographic Characteristics

Sociodemographic Characteristic	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Sex										
Male	20.0	(1.9)	20.2	(1.3)	28.8	(2.4)	11.6	(1.1)	18.8	(0.9)
Female	5.1	(1.2)	7.7	(2.4)	7.3	(1.4)	3.6	(0.7)	5.3	(0.8)
Race/Ethnicity										
White, non-Hispanic	19.6	(2.2)	19.9	(1.6)	31.2	(2.9)	11.2	(1.2)	18.4	(1.0)
Black, non-Hispanic	11.7	(1.9)	15.4	(2.1)	15.3	(2.7)	7.0	(1.4)	11.9	(1.0)
Hispanic	22.4	(3.1)	19.6	(3.5)	27.0	(2.4)	8.3	(1.1)	19.3	(1.6)
Other	18.5	(4.5)	15.7	(3.4)	20.1	(4.3)	8.0	(1.4)	15.0	(2.0)
Education										
High school or less	25.9	(2.7)	25.2	(2.1)	32.4	(2.6)	16.1	(1.6)	25.2	(1.3)
Some college	17.1	(1.5)	17.0	(1.6)	24.8	(2.0)	11.3	(1.0)	15.7	(0.7)
College graduate or higher	5.6	(1.1)	5.6	(1.0)	12.7	(2.3)	3.3	(0.8)	5.2	(0.6)
Age										
20 and under	26.8	(2.9)	29.8	(3.4)	40.4	(3.5)	14.1	(1.4)	27.9	(1.7)
21-25	24.7	(2.1)	26.6	(2.1)	35.2	(2.0)	17.0	(1.9)	24.8	(1.1)
26-34	14.1	(1.8)	15.4	(1.7)	16.3	(1.0)	9.0	(1.3)	13.0	(0.9)
35 and older	7.4	(1.5)	9.3	(1.0)	8.5	(1.0)	4.0	(0.6)	6.9	(0.6)
Family Status										
Not married	26.0	(2.2)	28.5	(2.3)	39.3	(3.2)	16.2	(1.8)	26.3	(1.2)
Married, spouse not present	18.3	(3.2)	21.0	(4.6)	28.2	(4.5)	9.2	(3.7)	19.2	(2.1)
Married, spouse present	11.2	(1.7)	11.8	(0.9)	14.2	(1.2)	7.3	(0.8)	10.3	(0.6)
Pay Grade										
E1-E3	28.1	(1.8)	32.4	(2.5)	40.6	(3.4)	17.1	(1.6)	29.3	(1.3)
E4-E6	20.0	(2.2)	18.2	(1.9)	24.6	(1.4)	11.4	(1.2)	17.4	(1.0)
E7-E9	8.8	(1.0)	11.4	(1.4)	10.2	(1.3)	7.4	(0.6)	9.2	(0.6)
W1-W5	6.0	(1.7)	9.5	(1.6)	11.1	(2.3)	NA	(NA)	7.3	(1.1)
O1-O3	6.7	(1.4)	6.1	(1.4)	14.7	(2.7)	3.7	(1.2)	6.0	(0.8)
O4-O10	1.4	(0.6)	2.0	(0.8)	3.8	(0.9)	1.6	(0.5)	1.8	(0.4)
Region										
CONUS[a]	17.8	(2.2)	19.1	(1.6)	25.8	(1.9)	9.2	(1.3)	16.7	(1.0)
OCONUS[b]	18.8	(2.4)	16.7	(1.8)	34.7	(8.2)	14.3	(1.7)	19.1	(1.7)
Total	18.0	(1.8)	18.8	(1.4)	27.8	(2.4)	10.3	(1.1)	17.1	(0.8)

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

NA = Not applicable.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behavior Among Military Personnel, 1995.

Table D.6 Any Illicit Drug Use (Excluding Steroids), Past 12 Months, by Sociodemographic Characteristics

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	9.7 (1.2)	7.2 (0.9)	7.4 (1.2)	2.5 (0.4)	6.7 (0.5)
Female	6.1 (0.7)	7.9 (1.2)	6.2 (1.4)	2.5 (0.5)	5.3 (0.5)
Race/Ethnicity					
White, non-Hispanic	9.1 (1.3)	7.4 (0.8)	8.3 (1.4)	2.5 (0.4)	6.4 (0.5)
Black, non-Hispanic	7.9 (0.7)	7.3 (2.0)	4.9 (1.4)	2.6 (0.9)	6.3 (0.7)
Hispanic	12.0 (2.3)	7.1 (1.1)	6.5 (1.2)	2.1 (1.1)	7.6 (1.0)
Other	11.6 (3.2)	6.6 (1.2)	3.5 (1.5)	2.6 (1.2)	6.8 (1.1)
Education					
High school or less	13.9 (0.9)	8.9 (1.2)	8.8 (1.1)	3.5 (0.9)	9.6 (0.6)
Some college	8.5 (1.5)	7.2 (0.8)	6.8 (1.5)	2.7 (0.3)	6.0 (0.6)
College graduate or higher	2.2 (0.5)	3.1 (0.6)	1.3 (0.2)	1.2 (0.5)	2.0 (0.3)
Age					
20 and under	19.0 (1.7)	16.6 (2.5)	14.0 (1.9)	4.9 (1.1)	14.9 (1.1)
21-25	12.5 (1.6)	10.3 (1.2)	9.3 (1.3)	4.3 (0.9)	9.4 (0.7)
26-34	6.0 (1.2)	4.8 (1.2)	1.9 (0.6)	1.4 (0.4)	3.9 (0.6)
35 and older	2.3 (0.7)	3.0 (0.8)	1.3 (0.3)	1.4 (0.5)	2.1 (0.3)
Family Status					
Not married	14.4 (1.6)	11.1 (1.1)	10.6 (1.9)	4.5 (0.8)	10.6 (0.8)
Married, spouse not present	9.5 (2.6)	+ (+)	9.2 (1.9)	0.5 (0.5)	7.6 (1.6)
Married, spouse present	4.8 (0.8)	4.7 (0.7)	3.2 (0.7)	1.5 (0.2)	3.5 (0.3)
Pay Grade					
E1-E3	19.8 (2.1)	15.9 (1.7)	13.5 (1.6)	5.2 (1.0)	14.3 (0.9)
E4-E6	8.8 (1.4)	6.1 (1.0)	4.6 (0.8)	2.5 (0.5)	5.8 (0.6)
E7-E9	1.7 (0.4)	2.0 (0.5)	1.5 (0.4)	0.8 (0.2)	1.5 (0.2)
W1-W5	0.7 (0.4)	2.8 (1.3)	0.8 (0.5)	NA (NA)	1.0 (0.4)
O1-O3	2.7 (1.0)	2.7 (1.3)	2.0 (0.6)	1.0 (0.7)	2.0 (0.5)
O4-O10	1.1 (0.4)	1.2 (0.4)	1.4 (0.6)	0.7 (0.4)	1.0 (0.2)
Region					
CONUS[a]	10.3 (1.3)	7.7 (0.8)	7.3 (1.2)	2.6 (0.5)	7.0 (0.6)
OCONUS[b]	5.6 (1.4)	3.9 (2.2)	7.3 (3.3)	2.0 (**)	4.4 (0.8)
Total	9.2 (1.1)	7.3 (0.8)	7.3 (1.2)	2.5 (0.4)	6.5 (0.5)

Note: Table values are percentages of personnel reporting any drug use in the past 12 months, excluding steroids (with standard errors in parentheses).

NA = Not applicable.

**Estimate rounds to zero.

+Low precision.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behavior Among Military Personnel, 1995.

Table D.7 Patterns of Cigarette Smoking, Past 30 Days, by Smoking Level

Smoking Level	Service: Army	Service: Navy	Service: Marine Corps	Service: Air Force	Total DoD
Didn't Smoke	64.0 (1.8)	63.1 (1.7)	62.5 (1.9)	73.7 (1.4)	66.3 (0.9)
½ Pack or Less/Day (1-15 cig.)	19.0 (1.2)	20.5 (1.4)	22.4 (1.2)	15.1 (0.8)	18.7 (0.7)
About 1 Pack/Day (16-25 cig.)	10.9 (0.9)	11.2 (0.8)	10.5 (0.9)	7.8 (0.7)	10.1 (0.4)
About 1½ Packs/Day (26-35 cig.)	4.2 (0.5)	3.5 (0.4)	3.4 (0.3)	2.5 (0.4)	3.4 (0.2)
About 2 or More Packs/Day (>36 cig.)	1.9 (0.3)	1.6 (0.4)	1.1 (0.2)	0.9 (0.2)	1.5 (0.2)

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

Source: DoD Survey of Health Related Behavior Among Military Personnel, 1995.

Table D.8 Cigarette Use, Past 30 Days, by Sociodemographic Characteristics

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Sex					
Male	35.1 (1.7)	35.8 (1.7)	35.3 (1.8)	25.4 (1.4)	32.7 (0.9)
Female	27.5 (1.6)	28.3 (1.8)	28.0 (2.0)	23.6 (2.0)	26.3 (1.0)
Race/Ethnicity					
White, non-Hispanic	37.2 (2.0)	38.6 (2.0)	38.4 (2.9)	26.6 (1.7)	34.4 (1.1)
Black, non-Hispanic	25.1 (1.8)	21.6 (3.4)	22.8 (2.5)	22.6 (1.2)	23.4 (1.2)
Hispanic	32.4 (3.5)	29.2 (4.7)	30.9 (2.2)	17.9 (2.7)	28.1 (1.9)
Other	39.3 (2.9)	35.0 (2.6)	35.1 (4.9)	20.9 (3.3)	32.9 (1.6)
Education					
High school or less	43.3 (1.8)	41.9 (0.9)	39.4 (1.5)	36.2 (2.0)	41.0 (0.8)
Some college	35.8 (1.9)	35.1 (2.6)	35.0 (2.5)	29.2 (1.1)	33.3 (1.0)
College graduate or higher	13.3 (2.2)	15.4 (1.8)	12.3 (1.3)	7.3 (0.9)	11.5 (0.9)
Age					
20 and under	39.6 (3.6)	41.5 (2.0)	48.3 (2.3)	34.2 (2.2)	40.8 (1.5)
21-25	37.2 (1.9)	35.2 (2.0)	38.3 (1.8)	30.0 (0.9)	35.0 (0.9)
26-34	34.7 (3.2)	32.7 (2.8)	22.7 (1.1)	22.3 (1.4)	29.2 (1.4)
35 and older	24.8 (1.8)	35.0 (2.4)	26.3 (2.0)	21.5 (2.0)	26.9 (1.2)
Family Status					
Not married	38.2 (1.4)	37.1 (1.9)	41.1 (2.2)	27.4 (1.6)	35.7 (0.9)
Married, spouse not present	37.3 (3.1)	28.3 (4.0)	35.7 (3.8)	23.1 (5.1)	33.1 (2.1)
Married, spouse present	30.1 (2.2)	34.0 (2.0)	27.7 (1.9)	24.0 (1.4)	29.0 (1.1)
Pay Grade					
E1-E3	37.8 (2.0)	43.7 (2.0)	47.5 (1.8)	35.5 (2.0)	40.8 (1.0)
E4-E6	39.6 (1.8)	36.4 (2.3)	30.6 (1.6)	28.9 (1.3)	34.8 (1.1)
E7-E9	33.4 (1.4)	38.6 (1.5)	31.2 (2.2)	26.7 (1.5)	32.6 (0.8)
W1-W5	20.3 (2.4)	31.8 (4.2)	21.9 (4.1)	NA (NA)	22.4 (2.0)
O1-O3	13.6 (2.3)	12.3 (2.2)	11.3 (2.0)	4.1 (1.2)	9.5 (1.0)
O4-O10	7.3 (1.4)	7.8 (1.7)	10.0 (1.3)	6.1 (1.3)	7.1 (0.8)
Region					
CONUS[a]	33.7 (2.0)	35.0 (1.8)	34.7 (1.6)	24.6 (1.6)	31.7 (1.0)
OCONUS[b]	35.5 (2.6)	34.4 (1.1)	36.0 (5.5)	27.0 (1.4)	32.7 (1.4)
Total	34.1 (1.6)	34.9 (1.6)	35.0 (1.8)	25.1 (1.3)	31.9 (0.9)

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

NA = Not applicable.

[a]Refers to personnel stationed within the 48 contiguous States in the continental United States.

[b]Refers to personnel stationed outside the continental United States.

Source: DoD Survey of Health Related Behavior Among Military Personnel, 1995.

Table D.9 Cigarette Use During Past 30 Days, by Pay Grade

Pay Grade/ Smoking Measure	Service: Army	Navy	Marine Corps	Air Force	Total DoD
E1-E3					
Any smoking	37.8 (2.0)	43.7 (2.0)	47.5 (1.8)	35.5 (2.0)	40.8 (1.0)
Heavy smoking	19.1 (1.4)	16.5 (2.1)	18.6 (1.8)	11.8 (1.5)	16.7 (0.9)
E4-E6					
Any smoking	39.6 (1.8)	36.4 (2.3)	30.6 (1.6)	28.9 (1.3)	34.8 (1.1)
Heavy smoking	19.4 (1.2)	17.1 (1.9)	13.9 (1.8)	13.3 (1.1)	16.5 (0.8)
E7-E9					
Any smoking	33.4 (1.4)	38.6 (1.5)	31.2 (2.2)	26.7 (1.5)	32.6 (0.8)
Heavy smoking	19.6 (1.2)	25.3 (2.1)	19.3 (1.6)	17.2 (1.0)	20.4 (0.8)
W1-W5					
Any smoking	20.3 (2.4)	31.8 (4.2)	21.9 (4.1)	NA (NA)	22.4 (2.0)
Heavy smoking	14.5 (1.9)	19.0 (2.7)	13.0 (3.0)	NA (NA)	15.0 (1.5)
O1-O3					
Any smoking	13.6 (2.3)	12.3 (2.2)	11.3 (2.0)	4.1 (1.2)	9.5 (1.0)
Heavy smoking	3.4 (1.3)	6.4 (1.7)	1.4 (0.5)	0.6 (0.3)	2.9 (0.6)
O4-O10					
Any smoking	7.3 (1.4)	7.8 (1.7)	10.0 (1.3)	6.1 (1.3)	7.1 (0.8)
Heavy smoking	4.1 (1.2)	4.0 (1.3)	4.9 (0.8)	3.0 (0.8)	3.7 (0.6)
Total DoD					
Any smoking	34.1 (1.6)	34.9 (1.6)	35.0 (1.8)	25.1 (1.3)	31.9 (0.9)
Heavy smoking	17.0 (1.0)	16.3 (1.4)	15.0 (1.2)	11.2 (0.8)	15.0 (0.6)

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

NA = Not applicable.

Source: DoD Survey of Health Related Behavior Among Military Personnel, 1995.

APPENDIX E

CALCULATION OF ALCOHOL SUMMARY MEASURES

APPENDIX E

CALCULATION OF ALCOHOL SUMMARY MEASURES

This appendix provides details about the construction of two summary measures of alcohol use that we use throughout this report. Both of these measures combine information on quantity and frequency of alcohol consumption across three types of beverages: beer, wine, and liquor. We first describe the drinking-level classification measure and then the average daily ounces of ethanol index.

E.1 Drinking Level Classification Measure

The drinking-level classification scheme was adapted from Mulford and Miller (1960; see also Rachal et al., 1980; Rachal, Hubbard, Williams, & Tuchfeld, 1976) and used previously in the 1982, 1985, 1988, and 1992 DoD surveys (Bray et al., 1983, 1986, 1988, 1992). The classification scheme used (a) the "quantity per typical drinking occasion" and (b) the "frequency of drinking" for the type of beverage (beer, wine, or liquor) with the largest amount of absolute alcohol per day to fit individuals into 1 of the 10 categories resulting from all combinations of quantity and frequency of consumption. The 10 categories describe whether individuals abstained, drank once a month, three to four times a month, or at least once a week and whether small, medium, or large amounts of alcohol were drunk during a typical drinking occasion.

The second step in forming the classification scheme was to combine the 10 quantity/frequency categories into five drinking levels: abstainers, infrequent/light drinkers, moderate drinkers, moderate/heavy drinkers, and heavy drinkers. The resulting five drinking levels and their definitions are presented in Table E.1.

E.2 Average Daily Ounces of Ethanol Index

The average daily ethanol consumption index 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 15, 18, and 21). 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.

Table E.1 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.

Source: 1995 DoD Survey of Health Related Behaviors Among Military Personnel.

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.

Source: 1995 DoD Survey of Health Related Behaviors Among Military Personnel.

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 17, 20, and 23). For quantities up through eight beers, glasses of wine, or drinks of liquor, the code we used was the exact number that the respondent indicated on Questions 17, 20, and 23.

For larger quantities of each beverage for which the answer was a range, the value we used was the midpoint of the range (e.g., we coded 9 to 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 (Question 16) and strength of drinks containing liquor (Question 22). Respondents indicated the size can or bottle of beer they usually drank (Question 16), with alternatives of 8-, 12-, or 16-ounce containers, and the number of ounces of liquor in their average drink (Question 22), 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. Because we used the standard 4-ounce size for wineglasses, 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. Because 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 19). 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 past year (Questions 28, 29, and 30). 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 ounce of ethanol). The response alternatives and corresponding frequency codes for these questions are listed in Table E.3. The sum of these three frequency codes (beer, wine, and liquor) constitutes the measure of the "frequency of heavy drinking" (i.e., days of atypical high consumption).

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.

Source: 1995 DoD Survey of Health Related Behaviors Among Military Personnel.

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, **365 x *F***, minus the number of atypical days. If the respondent typically consumed 8 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 **(365 x *F* - *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:

$$AQnF = \frac{5D + Qn\ (365 \times F\text{-}D)}{365}$$

where

AQnF = average daily volume of ethanol consumed in the form of the given beverage,

D = number of atypical high consumption days for the given beverage (0 if ***Qn*** is greater than or equal to 5 for the given beverage),

Qn = volume of ethanol consumed on typical drinking days for the given beverage, and

F = probability of consuming the given beverage on a given day.

We then summed the composite volume measures for the three beverages to equal the total average daily volume measure. In so doing, we applied the following constraints: (a) 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.

References for Appendix E

Bray, R.M., Guess, L.L., Mason, R.E., Hubbard, R.L., Smith, D.G., Marsden, M.E., & Rachal, J.V. (1983). *1982 Worldwide Survey of Alcohol and Non-medical Drug Use Among Military Personnel* (RTI/2317/01-01F). Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Kroutil, L.A., Luckey, J.W., Wheeless, S.C., Iannacchione, V.G., Anderson, D.W., Marsden, M.E., & Dunteman, G.H. (1992). *1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel*. Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Marsden, M.E., Guess, L.L., Wheeless, S.C., Pate, D.K., Dunteman, G.H., & Iannacchione, V.G. (1986). *1985 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel.* Research Triangle Park, NC: Research Triangle Institute.

Bray, R.M., Marsden, M.E., Guess, L.L., Wheeless, S.C., Iannacchione, V.G., & Keesling, S.R. (1988). *1988 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel.* Research Triangle Park, NC: Research Triangle Institute.

Mulford, H.A., & Miller, D.A. (1960). Drinking in Iowa: 2. The extent of drinking and selected sociocultural categories. *Quarterly Journal of Studies on Alcohol, 21,* 26-39.

Rachal, J.V., Guess, L.L., Hubbard, R.L., Maisto, S.A., Cavanaugh, E.R., Waddell, R., & Benrud, C.H. (1980). *Adolescent drinking behavior: Vol. 1. The extent and nature of adolescent alcohol and drug use: The 1974 and 1978 National Sample Studies* (NTIS No. PB81-199267). Research Triangle Park, NC: Research Triangle Institute.

Rachal, J.V., Hubbard, R.L., Williams, J.R., & Tuchfeld, B. (1976). Drinking levels and problem drinking among junior and senior high students. *Journal of Studies on Alcohol, 37,* 1751-1761.

Rachal, J.V., Williams, J.R., Brehm, M.L., Cavanaugh, E.R., Moore, R.P., & Eckerman, W.C. (1975). *A national study of adolescent drinking behavior, attitudes, and correlates* (DHHS Publication No. ADM 85-1402). Research Triangle Park, NC: Research Triangle Institute.

APPENDIX F

TECHNICAL DISCUSSION OF STANDARDIZATION APPROACH AND MULTIVARIATE ANALYSES

APPENDIX F

TECHNICAL DISCUSSION OF STANDARDIZATION APPROACH AND MULTIVARIATE ANALYSES

In this appendix, we present technical details of the standardization procedures and multivariate analyses described in chapters of the report. We first describe our approach to standardization and follow this with a discussion of logistic regression.

F.1 Standardization Approaches

An important part of many analyses is the assessment of differences between two or more groups with respect to a population characteristic. For instance, in this report we have compared substance use between Services, between the Military and the civilian population, and between the Military in 1995 and the Military in prior survey years. 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 the technique of direct standardization for the standardized comparisons presented in this report (Kalton, 1968). 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. Direct standardization requires separate cell estimates for the complete cross-classification of all of the confounding and study variables. Although this requirement can limit the number of confounding variables that can be controlled (i.e., due to small sample sizes in each cell of the cross-classification), our sample sizes in 1995 permitted use of this approach. In particular, the oversampling of women in 1992 resulted in adequate cell sizes formed by the cross-tabulation of gender with other variables.

We used SUDAAN (SUrvey DAta ANalysis) software developed at Research Triangle Institute for direct standardizations in this report (Shah, Barnwell, & Bieler, 1995). In particular, we used SUDAAN's DESCRIPT procedure that provides sample

design-based estimates of the standard errors of the standardized and unstandardized estimates. We calculated *t* tests to assess the statistical significance of the differences between comparison groups (e.g., military and civilian populations, Services).

F.1.1 Demographic Variables Included in Standardizations

We considered the following demographic characteristics for standardization variables: age, race/ethnicity, sex (gender), 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 racial/ethnic distribution is very similar in two populations (e.g., the 1995 military population and the military population in prior years), then it makes no difference in the estimate if race/ethnicity is or is not included as a standardizing variable. Similarly, if the estimates of the outcome variable are similar for men and women, for example, then it makes no difference in the standardized estimate if gender is included.

Including 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. As discussed above, if two populations do not differ appreciably with respect to some characteristic (e.g., race/ethnicity), or if the outcome of interest does not differ appreciably according to a particular demographic characteristic, then including these variables would add little to the standardized comparison. 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 1995 DoD Distributions to the 1980 Distribution. We standardized the 1995 DoD survey data (and the 1992, 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 or baseline for adjusting the age, education, and marital status characteristics of the other populations. Prior examination of demographic changes in the Military indicated that age, education, and marital status were the characteristics that exhibited the greatest change since 1980 (Bray, Kroutil, & Marsden, 1995).

For each measure (proportion of drug users, proportion of smokers, ounces of ethanol, etc.), we first calculated the estimate of 1995 use for each of the standardizing cells formed by the cross-tabulation 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 1995 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, and so on might be in 1995 if the 1995 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. Although the proportion of women in the Military increased from approximately 9% in 1980 to 12% in 1995 (Table 2.4), these increases were not large ones, and the military population in the early to mid-1990s continued to be predominantly male. Similarly, 19% of the military population in 1980 was black (Bray et al., 1995) compared with 17% in 1995 (Table 2.4). These data suggest that the inclusion or exclusion of these variables would have had little effect on the standardized estimate.

Standardization of Services to the DoD Distribution for Service-Level Comparisons of 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/ethnicity, 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. The oversampling of women and Marine Corps personnel in 1995 permitted use of the direct standardization approach. Sample sizes were sufficiently large to produce stable estimates, with standardizing cells formed by the cross of gender, age, race/ethnicity, educational attainment, and marital status.

Standardization of Civilian Data to the Military Distribution. We compared data on substance use from the 1994 National Household Survey on Drug Abuse (NHSDA) with that from the 1995 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 dataset to persons between the ages of 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 gender, age, race/ethnicity, educational attainment, and marital status.

F.2 Multivariate Regression Analyses

For Chapters 4, 5, and 6, we conducted multivariate logistic regression analyses to examine the independent relationships between different demographic characteristics and heavy alcohol use, illicit drug use, and cigarette smoking, respectively. We used logistic regression to model binary dependent measures (e.g., drug use vs. no drug use). 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 (e.g., no illicit drug use = 0; any illicit drug use = 1), 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.

As discussed above, we fitted separate logistic regression models for heavy alcohol use in the past 30 days, any illicit drug use in the past 12 months, and cigarette smoking in the past 30 days. For the logistic regression model for heavy alcohol use, we excluded abstainers from the model in order to identify independent predictors of heavy alcohol use among those personnel who were alcohol users. For each of the models, we modeled the outcome variable as a function of the following demographic variables: Service, gender, race/ethnicity, education, age, family status (i.e., marital status and presence/absence of spouse if married), pay grade, and region (i.e., stationed within the continental United States [CONUS] or outside the continental United States [OCONUS]).

We used the SUDAAN regression procedure LOGIST (discussed in Appendix B) for estimating the parameters, preparing the variance-covariance matrix, and performing statistical tests about the parameters. The results of the logistic regression analyses were expressed as odds ratios, with the odds ratio of the reference group (e.g., Air Force was the reference group against which the other Services were compared) expressed as 1.00. Odds ratios greater than 1.00 indicate a greater likelihood of the comparison group exhibiting the outcome of interest (e.g., heavy alcohol use) relative to the reference group. Odds ratios less than 1.00 indicate a lower likelihood of the comparison group exhibiting the outcome of interest.

We also show 95% confidence intervals for the odds ratios based on these logistic regression analyses. If the odds of a person being a heavy alcohol user, illicit drug user, or smoker in a comparison group (e.g., Army, Navy, or Marine Corps) were significantly different from the odds of a person in the reference group having this outcome, then the odds ratio of the comparison group to the reference group (e.g., Army vs. Air Force) was significantly different from 1.00. An odds ratio that is significantly different from 1.00 is indicated by a 95% confidence interval that does not include 1.00 in the interval.

References for Appendix F

Bray, R.M., Kroutil, L.A., & Marsden, M.E. (1995). Trends in alcohol, illicit drug, and cigarette use among U.S. military personnel: 1980-1992. *Armed Forces & Society*, *21*, 271-293.

Kalton, G. (1968). Standardization: A technique to control for extraneous variables. *Applied Statistics*, *23*, 118-136.

Konijn, H.S. (1973). *Statistical theory of sample survey design and analysis*. London: North-Holland.

Little, R.J.A. (1982). Direct standardization as a tool for teaching linear models for unbalanced data. *American Statistician*, *36*(1), 38-43.

Shah, B.V., Barnwell, B.G., & Bieler, G.S. (1995). *SUDAAN user's manual: Release 6.4*. Research Triangle Park, NC: Research Triangle Institute.

APPENDIX G

COMPARISONS OF ALCOHOL DRINKING LEVELS BASED ON TWO ESTIMATION PROCEDURES

Table G.1 Trends in Drinking Levels Based on Two Estimation Procedures for the Total DoD, 1985-1995

Drinking Level/ Procedure	Year							
	1985		1988		1992		1995	
Abstainer								
Procedure A[a]	13.4	(0.6)	17.2	(0.4)	20.4	(0.8)	21.1	(0.5)
Procedure B[b]	13.3	(0.6)	17.2	(0.4)	20.0	(0.8)	20.7	(0.5)
Infrequent/Light								
Procedure A[a]	16.6	(0.7)	17.6	(0.5)	18.9	(0.5)	18.6	(0.6)
Procedure B[b]	16.5	(0.7)	17.5	(0.5)	18.5	(0.4)	18.5	(0.6)
Moderate								
Procedure A[a]	18.6	(0.6)	19.5	(0.5)	19.6	(0.5)	18.9	(0.5)
Procedure B[b]	18.7	(0.6)	19.4	(0.5)	19.6	(0.5)	19.0	(0.5)
Moderate/Heavy								
Procedure A[a]	28.5	(0.8)	28.7	(0.7)	26.0	(0.6)	24.2	(0.6)
Procedure B[b]	28.5	(0.8)	28.8	(0.7)	26.3	(0.6)	24.5	(0.6)
Heavy								
Procedure A[a]	22.9	(1.1)	17.0	(0.9)	15.1	(0.7)	17.1	(0.8)
Procedure B[b]	23.0	(1.1)	17.2	(0.9)	15.5	(0.8)	17.4	(0.9)

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

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

Table G.2 Trends in Drinking Levels Based on Two Estimation Procedures for the Army, 1985-1995

Drinking Level/ Procedure	Year							
	1985		1988		1992		1995	
Abstainer								
Procedure A[a]	14.9	(0.7)	17.1	(0.7)	21.8	(1.4)	21.1	(1.0)
Procedure B[b]	14.6	(0.7)	16.9	(0.7)	21.4	(1.4)	20.6	(1.0)
Infrequent/Light								
Procedure A[a]	16.6	(1.1)	17.0	(0.9)	17.7	(0.6)	18.1	(1.4)
Procedure B[b]	16.4	(1.1)	16.8	(0.9)	17.2	(0.8)	18.0	(1.4)
Moderate								
Procedure A[a]	17.6	(0.7)	19.5	(0.8)	17.3	(0.8)	18.1	(0.9)
Procedure B[b]	17.8	(0.7)	19.5	(0.7)	17.3	(0.8)	18.0	(1.0)
Moderate/Heavy								
Procedure A[a]	25.6	(1.8)	27.0	(0.8)	26.1	(1.4)	24.7	(1.0)
Procedure B[b]	25.7	(1.8)	27.1	(0.8)	26.5	(1.4)	25.0	(1.1)
Heavy								
Procedure A[a]	25.2	(2.2)	19.4	(1.1)	17.1	(1.5)	18.0	(1.8)
Procedure B[b]	25.5	(2.2)	19.7	(1.2)	17.7	(1.6)	18.4	(1.8)

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

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

Table G.3 Trends in Drinking Levels Based on Two Estimation Procedures for the Navy, 1985-1995

Drinking Level/ Procedure	Year							
	1985		1988		1992		1995	
Abstainer								
Procedure A[a]	9.6	(0.8)	15.7	(0.6)	19.9	(2.1)	19.4	(0.9)
Procedure B[b]	9.6	(0.8)	15.7	(0.6)	19.6	(1.9)	19.0	(0.9)
Infrequent/Light								
Procedure A[a]	18.8	(2.0)	18.3	(0.9)	19.1	(1.1)	19.0	(1.1)
Procedure B[b]	18.8	(2.0)	18.2	(0.9)	18.6	(0.9)	18.7	(1.1)
Moderate								
Procedure A[a]	18.7	(1.1)	20.8	(1.2)	20.2	(1.2)	19.0	(1.0)
Procedure B[b]	18.7	(1.0)	20.7	(1.2)	20.2	(1.2)	19.2	(0.9)
Moderate/Heavy								
Procedure A[a]	27.9	(1.4)	30.6	(1.5)	27.0	(0.7)	23.8	(1.6)
Procedure B[b]	27.9	(1.4)	30.7	(1.5)	27.4	(0.7)	24.0	(1.6)
Heavy								
Procedure A[a]	24.9	(1.4)	14.6	(2.0)	13.8	(1.4)	18.8	(1.4)
Procedure B[b]	25.0	(1.4)	14.7	(2.0)	14.2	(1.7)	19.1	(1.5)

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

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

Table G.4 Trends in Drinking Levels Based on Two Estimation Procedures for the Marine Corps, 1985-1995

Drinking Level/ Procedure	Year							
	1985		1988		1992		1995	
Abstainer								
Procedure A[a]	10.8	(2.5)	18.0	(0.9)	15.0	(0.6)	16.9	(0.7)
Procedure B[b]	10.8	(2.5)	18.0	(0.9)	14.6	(0.5)	16.4	(0.7)
Infrequent/Light								
Procedure A[a]	13.6	(1.7)	16.1	(2.9)	15.4	(1.2)	14.2	(0.6)
Procedure B[b]	13.6	(1.7)	16.1	(2.9)	14.4	(1.2)	13.9	(0.7)
Moderate								
Procedure A[a]	15.1	(2.1)	14.0	(1.0)	19.2	(1.4)	17.4	(1.1)
Procedure B[b]	15.1	(2.1)	13.9	(1.0)	19.5	(1.5)	17.2	(1.1)
Moderate/Heavy								
Procedure A[a]	31.1	(1.8)	27.8	(1.6)	25.1	(1.9)	23.6	(1.0)
Procedure B[b]	31.1	(1.8)	27.6	(1.9)	25.4	(1.9)	24.0	(0.9)
Heavy								
Procedure A[a]	29.4	(3.7)	24.1	(3.9)	25.3	(1.3)	27.8	(2.4)
Procedure B[b]	29.4	(3.7)	24.4	(4.2)	26.0	(1.3)	28.6	(2.5)

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

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

Table G.5 Trends in Drinking Levels Based on Two Estimation Procedures for the Air Force, 1985-1995

Drinking Level/ Procedure	Year							
	1985		1988		1992		1995	
Abstainer								
Procedure A[a]	15.8	(1.0)	18.5	(0.8)	21.3	(0.9)	24.4	(0.9)
Procedure B[b]	15.6	(1.0)	18.4	(0.8)	21.1	(0.8)	24.2	(0.9)
Infrequent/Light								
Procedure A[a]	15.4	(0.8)	18.2	(0.8)	21.3	(0.9)	20.5	(0.9)
Procedure B[b]	15.4	(0.8)	18.1	(0.8)	21.3	(0.9)	20.5	(0.9)
Moderate								
Procedure A[a]	20.8	(1.2)	19.8	(0.8)	21.5	(0.8)	20.5	(0.7)
Procedure B[b]	20.9	(1.2)	19.7	(0.8)	21.5	(0.7)	20.5	(0.7)
Moderate/Heavy								
Procedure A[a]	31.5	(1.1)	29.1	(1.1)	25.4	(0.9)	24.3	(1.0)
Procedure B[b]	31.5	(1.2)	29.2	(1.1)	25.4	(0.8)	24.5	(1.0)
Heavy								
Procedure A[a]	16.4	(1.4)	14.4	(1.0)	10.5	(0.8)	10.3	(1.1)
Procedure B[b]	16.5	(1.4)	14.5	(1.0)	10.6	(0.8)	10.4	(1.1)

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

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

Table G.6 Trends in Average Daily Ounces of Ethanol Consumed Based on Two Estimation Procedures, 1985-1995

Service/ Average Ounces	Year 1985	1988	1992	1995
Total DoD				
Procedure A[a]	1.22 (0.06)	0.90 (0.03)	0.75 (0.04)	0.83 (0.04)
Procedure B[b]	1.24 (0.06)	0.92 (0.03)	0.79 (0.04)	0.87 (0.04)
Army				
Procedure A[a]	1.38 (0.12)	1.09 (0.06)	0.83 (0.06)	0.92 (0.07)
Procedure B[b]	1.42 (0.13)	1.12 (0.06)	0.90 (0.06)	1.00 (0.07)
Navy				
Procedure A[a]	1.33 (0.10)	0.86 (0.07)	0.80 (0.10)	0.91 (0.08)
Procedure B[b]	1.34 (0.10)	0.88 (0.08)	0.85 (0.11)	0.93 (0.08)
Marine Corps				
Procedure A[a]	1.47 (0.22)	1.16 (0.12)	1.00 (0.06)	1.11 (0.07)
Procedure B[b]	1.49 (0.23)	1.20 (0.11)	1.04 (0.06)	1.19 (0.07)
Air Force				
Procedure A[a]	0.86 (0.07)	0.65 (0.03)	0.52 (0.03)	0.53 (0.04)
Procedure B[b]	0.87 (0.07)	0.66 (0.03)	0.52 (0.03)	0.54 (0.04)

Note: Estimates are expressed as mean values (with standard errors in parentheses).

[a]Based on procedure used in the 1980 and 1982 surveys. Does not take into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was not included in the 1980 and 1982 surveys.

[b]Takes into account reports of typical consumption of beer in 32-ounce or liter containers. Response category for typical consumption of beer in 32-ounce or liter containers was included beginning with the 1985 survey.

Source: DoD Surveys of Health Related Behaviors Among Military Personnel, 1985 to 1995.

APPENDIX H

1995 DoD SURVEY QUESTIONNAIRE

RCS # DD-HA(AR)1785

HEALTH AFFAIRS

1995 DEPARTMENT OF DEFENSE SURVEY OF HEALTH RELATED BEHAVIORS AMONG MILITARY PERSONNEL

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, tobacco, and drug use. Additional questions ask about health attitudes and behavior, such as questions on stress, exercise, high blood pressure, and sexual 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:**

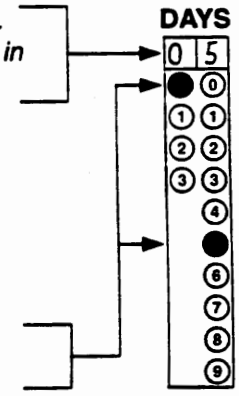
EXAMPLE: **How would you describe your health?**

○ 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

★U.S. GOVERNMENT PRINTING OFFICE: 1995–386-734/00016

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-W5	○ 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.*

AGE

0	0
1	1
2	2
3	3
4	4
5	5
6	6
	7
	8
	9

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. Which of these categories *best* describes you?

- ○ American Indian/Alaskan Native
- ○ Black/African-American
- ○ Oriental/Asian/Chinese/Japanese/Korean/Filipino/Pacific Islander
- ○ White/Caucasian
- ○ Other *(Please specify below)*

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. **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	○	○	○	○	○

14. **The statements below are about some other things that happen to people. How many times in the past 12 months did each of the following happen to you?**

(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.

15. 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

16. During the past 30 days, what size cans or bottles of beer did you usually drink? (Beer is most commonly sold and served in 12-ounce cans, mugs, bottles, or glasses in the U.S.)

- ○ 8-ounce can, bottle, or glass
- ○ Standard 12-ounce can, bottle, or mug
- ○ 16-ounce ("tall boy") can, bottle, or mug (½ liter)
- ○ Liter or quart (32-oz.) bottle or mug
- ○ Some other size
- ○ Didn't drink any beer in the past 30 days

17. 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

18. 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

19. 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, Barties & Jaymes, etc.)
- ○ Didn't drink any wine in the past 30 days

20. 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

21. 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

22. 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

23. 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

24. 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 make my food taste better	○	○	○	○	○
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 reduce my chances of having heart disease	○	○	○	○	○
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.

25. 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	○	○	○	○	○	○	○	○	○	○

26. 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	○	○	○	○	○	○	○	○

27. **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 other than a member of my family 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	○	○	○	○	○

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.

28. **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

29. **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

30. **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.

31. 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	○	○	○	○	○

32. 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	○	○	○	○

33. About how old were you when you <u>first</u> 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.*

○ I have never used alcohol at least once a month.

AGE

⓪	⓪
①	①
②	②
③	③
④	④
⑤	⑤
⑥	⑥
	⑦
	⑧
	⑨

34. How often do you <u>drive</u> a motor vehicle within <u>2 hours after drinking</u> 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

35. 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	○	○	○	○	○

36. The statements below are about some other things that happen to people because of using alcohol. How many times in the past 12 months did each of the following happen to you?

	NUMBER OF TIMES IN PAST 12 MONTHS				
(Darken one circle on each line)	3 or More	2	1	Never	Don't Drink
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	○	○	○	○	○

37. 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

38. 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

39. 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

40. 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

Now we would like to ask some questions about cigarettes and other tobacco products.

41. 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.

42. 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.

43. 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

44. Think about the past 30 days. How many cigarettes did you usually 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

45. For about how many years have you smoked the number of cigarettes in question 44? (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 did not smoke in the past 30 days, or I have never smoked cigarettes.

46. Have you smoked at least 100 cigarettes in your entire life? (That would be 5 packs or more in your entire life.)

○ Yes
○ No

47. During the past 12 months, 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

48. Are you seriously intending to quit smoking cigarettes in the next 6 months?

- ○ Yes
- ○ No
- ○ Don't smoke cigarettes

49. Are you planning to quit smoking cigarettes in the next 30 days?

- ○ Yes
- ○ No
- ○ Don't smoke cigarettes

50. When was the last time you used chewing tobacco or snuff or other smokeless tobacco?

- ○ During the past 30 days
- ○ More than 1 month ago but within the past 6 months
- ○ More than 6 months ago but within the past year
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago
- ○ Never used smokeless tobacco

51. How old were you when you first used chewing tobacco or snuff or other smokeless tobacco?

- *First, enter the age in the boxes. Use both boxes, ONE number to a 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 smokeless tobacco.

52. For how many years have you used chewing tobacco, snuff, or other smokeless tobacco?

- *First, enter the number of years in the boxes. Use both boxes, ONE number to a box.*
- *If you have used smokeless tobacco 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 used smokeless tobacco.

53. During the past 12 months, how often on the average have you used chewing tobacco or snuff or other smokeless tobacco?

- ○ About every day
- ○ 5-6 days a week
- ○ 3-4 days a week
- ○ 1-2 days a week
- ○ 2-3 days a month
- ○ About once a month
- ○ 7-11 days in the past 12 months
- ○ 3-6 days in the past 12 months
- ○ Once or twice in the past 12 months
- ○ Never in the past 12 months
- ○ Don't use smokeless tobacco

54. Have you used chewing tobacco or snuff or other smokeless tobacco at least 20 times in your entire life?

- ○ Yes
- ○ No

55. Have you started using chewing tobacco, snuff, or other smokeless tobacco because of military restrictions on where you can smoke cigarettes?

- ○ Yes
- ○ No
- ○ Don't use smokeless tobacco

56. During the past 12 months, how often on the average have you smoked cigars or a pipe?

- ○ 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

57. 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 smoking indoors while at work	○	○	○	○	○
Education about smoking at this installation helps keep people from starting to smoke	○	○	○	○	○
The personnel at this installation sincerely try to help people quit smoking	○	○	○	○	○
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	○	○	○	○	○
So many things cause cancer that it really doesn't matter if you smoke	○	○	○	○	○
Smokers should be allowed extra break time to get to a designated smoking area	○	○	○	○	○

58. 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	○	○	○	○	○
To give me a break from work	○	○	○	○	○

The next set of questions is about use of drugs 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.*

59. 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	○	○	○	○	○	○

60. 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						
	52 Days or More	25-51 Days	12-24 Days	6-11 Days	3-5 Days	1-2 Days	Never in Past Year
Marijuana or hashish	○	○	○	○	○	○	○
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	○	○	○	○	○	○	○

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
I can usually predict when I'm going to be selected for urinalysis testing	○	○	○	○	○
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	○	○	○	○	○
Some people get away with using drugs because they know when they're not likely to be tested	○	○	○	○	○
I would not use drugs even if there were no urinalysis testing	○	○	○	○	○

62. 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	○	○	○	○	○	○	○	○

63. **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
Anyone detected using marijuana should be discharged	○	○	○	○	○
Education about drugs at this installation helps keep people from using drugs	○	○	○	○	○
I am not opposed to personnel in my Service using marijuana when they're off-duty	○	○	○	○	○
Most of my friends use drugs, at least marijuana	○	○	○	○	○
There is no way to get help for a drug problem without one's commander finding out	○	○	○	○	○
My spouse or the person I date disapproves of drug use	○	○	○	○	○

The next question asks about some things that affect people *on their work days*.

64. **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
I was late for work by 30 minutes or more	○	○	○	○	○	○	○	○	○
I left work early for a reason other than an errand or early holiday leave	○	○	○	○	○	○	○	○	○
I was hurt in an on-the-job accident	○	○	○	○	○	○	○	○	○
I worked below my normal level of performance	○	○	○	○	○	○	○	○	○
I did not come to work at all because of an illness or a personal accident	○	○	○	○	○	○	○	○	○

The next set of questions deals mainly with your use of health services, your health attitudes, and your health behavior.

65. **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 in Past Month	Never in Past Month
Run, jog, bicycle, or briskly walk or hike for 20 minutes or more	○	○	○	○	○	○
Eat at least two full meals in 1 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 6 consecutive hours of sleep in 1 day	○	○	○	○	○	○
Engage in mild physical activity (e.g., baseball, bowling, volleyball, other sports) more for the recreation than for the exercise	○	○	○	○	○	○

159477-6/6

The next question asks about medical care that you received and illnesses that you had in the past 12 months. Do not count any times when you took another family member or someone else to receive medical care.

66. 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?	○	○	○	○	○	○	○	○	○

67. In the past 12 months, did you have any overnight hospital stays for treatment of an injury?

- ○ Yes
- ○ No

68. How often do you use seat belts when you drive or ride in a car?

- ○ Always
- ○ Nearly always
- ○ Sometimes
- ○ Seldom
- ○ Never
- ○ Don't drive or ride in a car

The next set of questions asks about your use of motorcycles or bicycles in the *past 12 months*— that is, since this time last year.

69 In the past 12 months, how many times did you drive or ride on a motorcycle?

- ○ 40 or more times
- ○ 21-39 times
- ○ 11-20 times
- ○ 1-10 times
- ○ Never in the past 12 months

70. In the past 12 months, how often did you wear a helmet when you drove or rode on a motorcycle?

- ○ Always
- ○ Nearly always
- ○ Sometimes
- ○ Seldom
- ○ Never
- ○ Didn't drive or ride on a motorcycle in the past 12 months

71. In the past 12 months, how many times did you ride a bicycle?

- ○ 40 or more times
- ○ 21-39 times
- ○ 11-20 times
- ○ 1-10 times
- ○ Never in the past 12 months

72. In the past 12 months, how often did you wear a helmet when you rode a bicycle?

- ○ Always
- ○ Nearly always
- ○ Sometimes
- ○ Seldom
- ○ Never
- ○ Didn't ride a bicycle in the past 12 months

73. In general, how would you describe your health?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Fair or poor

74. Thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health *not* good?

- ○ 28-30 days (about every day)
- ○ 20-27 days (5-6 days a week, average)
- ○ 11-19 days (3-4 days a week, average)
- ○ 4-10 days (1-2 days a week, average)
- ○ 2-3 days in the past 30 days
- ○ Once in the past 30 days
- ○ Never in the past 30 days

75. Now, thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health *not* good?

- ○ 28-30 days (about every day)
- ○ 20-27 days (5-6 days a week, average)
- ○ 11-19 days (3-4 days a week, average)
- ○ 4-10 days (1-2 days a week, average)
- ○ 2-3 days in the past 30 days
- ○ Once in the past 30 days
- ○ Never in the past 30 days

76. During the past 30 days, how often did poor physical or mental health keep you from doing your usual activities, such as work or recreation?

- ○ 28-30 days (about every day)
- ○ 20-27 days (5-6 days a week, average)
- ○ 11-19 days (3-4 days a week, average)
- ○ 4-10 days (1-2 days a week, average)
- ○ 2-3 days in the past 30 days
- ○ Once in the past 30 days
- ○ Never in the past 30 days

77. 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

78. 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

79. During the past 12 months, how much did stress at work interfere with your ability to perform your military job?

- ○ A lot
- ○ Some
- ○ A little
- ○ Not at all
- ○ Had no stress at work in the past 12 months

80. During the past 12 months, how much did stress in your family life interfere with your ability to perform your military job?

- ○ A lot
- ○ Some
- ○ A little
- ○ Not at all
- ○ Had no stress in the family in the past 12 months

81. In the past 12 months, have you had 2 weeks or more during which you felt sad, blue, or depressed, or when you lost all interest in things that you usually cared about or enjoyed?

- ○ Yes
- ○ No

82. In the past 12 months, have you felt depressed or sad much of the time?

- ○ Yes
- ○ No

83. In your entire life, have you *ever* had 2 years or more when you felt sad or depressed *on most days*, even if you felt okay sometimes?

- ○ Yes
- ○ No

84. How much of the time during the past week did you feel depressed?

- ○ 5-7 days
- ○ 3-4 days
- ○ 1-2 days
- ○ Less than 1 day or never in the past week

1594

85. During the past 12 months, how much stress did you experience from each of the following:

(Darken one circle on each line)	AMOUNT OF STRESS IN PAST 12 MONTHS					
	A Great Deal	A Fairly Large Amount	Some	A Little	None at All	Doesn't Apply
Being deployed at sea or in the field	○	○	○	○	○	○
Having a permanent change of station (PCS)	○	○	○	○	○	○
Problems in your relationships with the people you work with	○	○	○	○	○	○
Problems in your relationship with your immediate supervisor(s)	○	○	○	○	○	○
Concern about being separated from the military	○	○	○	○	○	○
Increases in your work load	○	○	○	○	○	○
Being away from your family	○	○	○	○	○	○
Changes in your family, such as the birth of a baby, a divorce, or a death in the family	○	○	○	○	○	○
Conflicts between your military and family responsibilities	○	○	○	○	○	○
Problems with money	○	○	○	○	○	○
Problems with housing	○	○	○	○	○	○
Health problems that you had	○	○	○	○	○	○
Health problems in your family	○	○	○	○	○	○

86. 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
Talk to a friend or family member	○	○	○	○
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	○	○	○	○
Think about hurting yourself or killing yourself	○	○	○	○

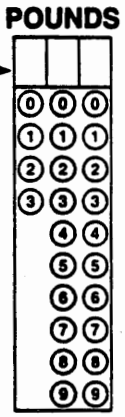
The next questions refer to your height, weight, and general health.

87. About how tall are you without shoes on?

- ○ 4 feet, 7 inches
- ○ 4 feet, 8 inches
- ○ 4 feet, 9 inches
- ○ 4 feet, 10 inches
- ○ 4 feet, 11 inches
- ○ 5 feet, 0 inches
- ○ 5 feet, 1 inch
- ○ 5 feet, 2 inches
- ○ 5 feet, 3 inches
- ○ 5 feet, 4 inches
- ○ 5 feet, 5 inches
- ○ 5 feet, 6 inches
- ○ 5 feet, 7 inches
- ○ 5 feet, 8 inches
- ○ 5 feet, 9 inches
- ○ 5 feet, 10 inches
- ○ 5 feet, 11 inches
- ○ 6 feet, 0 inches
- ○ 6 feet, 1 inch
- ○ 6 feet, 2 inches
- ○ 6 feet, 3 inches
- ○ 6 feet, 4 inches
- ○ 6 feet, 5 inches
- ○ 6 feet, 6 inches
- ○ 6 feet, 7 inches
- ○ 6 feet, 8 inches
- ○ 6 feet, 9 inches

88. About how much do you weigh without shoes on? (WOMEN: If you are currently pregnant, please enter your usual weight before you became pregnant.)

- *Enter your weight in the boxes. Use all three boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*



89. Since you joined the military, how easy or difficult has it been for you to get medical care, in general?

- ○ Very easy
- ○ Fairly easy
- ○ Fairly difficult
- ○ Very difficult
- ○ Don't know/no opinion

90. At this installation, how easy or difficult has it been for you to get medical care, in general?

- ○ Very easy
- ○ Fairly easy
- ○ Fairly difficult
- ○ Very difficult
- ○ Don't know/no opinion

91. How satisfied or dissatisfied have you been with the quality of health care you have received at this installation?

- ○ Very satisfied
- ○ Satisfied
- ○ Dissatisfied
- ○ Very dissatisfied
- ○ Don't know/no opinion

92. When was the last time you had your cholesterol checked by a doctor or other health professional?

- ○ During the past 30 days
- ○ More than 1 month ago but within the past 6 months
- ○ More than 6 months ago but within the past year
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago but within the past 5 years
- ○ More than 5 years ago
- ○ Don't know/don't remember
- ○ Never had my cholesterol checked

93. Have you ever been told by a doctor or other health professional that your cholesterol level was high?

- ○ Yes
- ○ No
- ○ Don't know/don't remember
- ○ Never had my cholesterol checked

94. When was the last time you had your blood pressure checked by a doctor or other health professional?

- ○ During the past 30 days
- ○ More than 1 month ago but within the past 6 months
- ○ More than 6 months ago but within the past year
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago
- ○ Don't know/don't remember
- ○ Never had my blood pressure checked

95. The last time you had your blood pressure checked, did the doctor or other health professional say your blood pressure was high, low, or normal?

- ○ High
- ○ Low
- ○ Normal
- ○ Something else
- ○ Not told
- ○ Don't know/don't remember
- ○ Never had my blood pressure checked

96. Have you ever been told by a doctor or other health professional that you had high blood pressure?

- ○ Yes
- ○ Yes, but only when I was pregnant
- ○ No
- ○ Don't know

97. Has a doctor ever prescribed medication to help lower your high blood pressure?

- ○ Yes
- ○ No
- ○ Never had high blood pressure

159477

98. Has a doctor or other health professional ever advised you to take any of the following actions to help lower your blood pressure?

(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	○	○	○

99. Are you currently taking any of the following actions to help lower your blood pressure?

(Darken one circle on each line)	Yes	No	Doesn't Apply
Dieting to lose weight	○	○	○
Cutting down on salt or sodium in your diet	○	○	○
Exercising	○	○	○
Cutting down on your use of alcohol	○	○	○
Taking prescribed blood pressure medication	○	○	○

100. 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?	○	○	○	○	○	○
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?	○	○	○	○	○	○

101. 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
The AIDS virus can be passed on through sexual intercourse between a man and a woman	○	○	○
A person who has the AIDS virus can look well and healthy	○	○	○
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	○	○	○

The next set of questions asks about sexual behavior. When we ask if you have "had sex" with a person, we are asking only if you have had vaginal or anal intercourse with that person. Specifically:

VAGINAL INTERCOURSE is when a man's penis is inside a woman's vagina.
ANAL INTERCOURSE is when a man's penis is inside his partner's anus or rectum.

Please answer these questions as accurately as you can. Remember, NO ONE will ever link your answers with your identity.

102. In the past 12 months, how many people have you had sex with?

- ○ 20 or more people
- ○ 10-19 people
- ○ 5-9 people
- ○ 2-4 people
- ○ 1 person
- ○ Did not have sex in the past 12 months

103. In your entire life, how many people have you had sex with?

- ○ 20 or more people
- ○ 10-19 people
- ○ 5-9 people
- ○ 2-4 people
- ○ 1 person
- ○ Have never had sex

104. When was the last time you had sex?

- ○ During the past 30 days
- ○ More than 1 month ago but within the past 6 months
- ○ More than 6 months ago but within the past year
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago
- ○ Have never had sex

105. The last time you had sex, did you or your partner use a condom?

- ○ Yes
- ○ No
- ○ Have never had sex

106. In the past 12 months, how often did you or your partner(s) use a condom when you had sex?

- ○ Every time
- ○ Most of the time
- ○ About half of the time
- ○ Some of the time
- ○ Hardly any of the time
- ○ Never
- ○ Did not have sex in the past 12 months

107. In the past 12 months, about how often, on average, did you have sex?

- ○ Daily
- ○ Almost daily (3 to 6 days a week)
- ○ About 1 or 2 days a week
- ○ Several days a month (about 25 to 51 days a year)
- ○ 1 to 2 days a month (12 to 24 days a year)
- ○ Every other month or so (6 to 11 days a year)
- ○ 3 to 5 days in the past 12 months
- ○ 1 or 2 days in the past 12 months
- ○ Did not have sex in the past 12 months

108. Please indicate how much you agree or disagree with the following statement:

The education I have received at this installation about sexually transmitted diseases has helped me make better decisions about my sexual behavior.

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree
- ○ Don't know/no opinion

109. In the past 12 months, did you have a sexually transmitted disease, such as gonorrhea, syphilis, chlamydia, or genital herpes?

- ○ Yes
- ○ No
- ○ Have never had a sexually transmitted disease

110. In your entire life, have you ever had a sexually transmitted disease, such as gonorrhea, syphilis, chlamydia, or genital herpes?

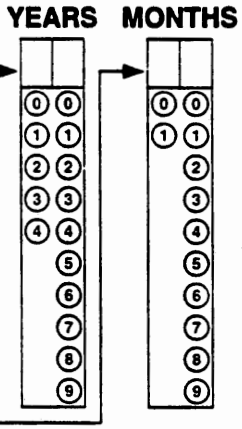
- ○ Yes
- ○ No

159477

This next set of questions deals mainly with your length of service, military job, and recent duty assignments.

111. 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 1 year) in the "Months" boxes. Use both boxes. Write ONE number in each box.*
- *Then, darken the matching circle below each box.*



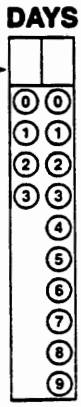
112. As of today, how many months have you been assigned to your present permanent post, base, ship, or duty station? (Include any extension of your present tour. Do not count previous tours at this duty station.)

- ○ 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

113. 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.*

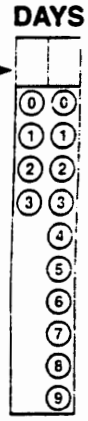
○ I had no official leave in the past 30 days.



114. 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.*

○ I was not deployed in the past 30 days.



115. When was the last time you were deployed at sea or in the field for 24 hours or more?

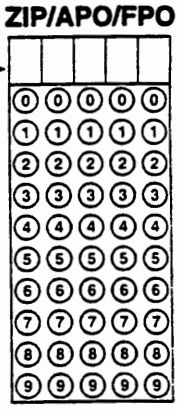
- ○ Never deployed at sea or in the field
- ○ 1-7 days ago
- ○ 8-13 days ago
- ○ 2-4 weeks ago
- ○ 5-7 weeks ago
- ○ 2-3 months ago
- ○ 4-6 months ago
- ○ 7-12 months ago
- ○ More than 1 year ago

116. 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

117. 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.*



118. Which of the following categories best describes your military job? (If you need to, please refer to the handout giving examples for different job categories.) *(Darken only one circle)*

ENLISTED

- ○ Infantry, Gun Crew, or Seamanship Specialist
- ○ Electronic Equipment Repairman
- ○ Communications or Intelligence Specialist
- ○ Health Care Specialist
- ○ Other Technical or Allied Specialist
- ○ Functional Support and Administration
- ○ Electrical/Mechanical Equipment Repairman
- ○ Craftsman
- ○ Service and Supply Handler
- ○ Non-Occupational

OFFICER

- ○ General Officer or Executive
- ○ Tactical Operations Officer
- ○ Intelligence Officer
- ○ Engineering or Maintenance Officer
- ○ Scientist or Professional (not involved with health care)
- ○ Health Care Officer
- ○ Administrator
- ○ Supply, Procurement, or Allied Officer
- ○ Non-Occupational

---

119. All in all, how satisfied or dissatisfied are you with your work assignment?

- ○ Very satisfied
- ○ Satisfied
- ○ Dissatisfied
- ○ Very dissatisfied

- **If you are MALE:** **PLEASE STOP HERE.**

  PLACE THE QUESTIONNAIRE IN THE BOX AS YOU LEAVE THE ROOM. THANK YOU FOR YOUR TIME AND COOPERATION.

- **If you are FEMALE:** **WE WOULD APPRECIATE IT IF YOU WOULD TAKE A FEW EXTRA MINUTES TO ANSWER SOME ADDITIONAL QUESTIONS ABOUT HEALTH ISSUES FOR WOMEN IN THE MILITARY.**

120. Since you joined the military, how easy or difficult has it been for you to get OB/GYN care, such as pelvic exams or Pap smears?

- ○ Very easy
- ○ Fairly easy
- ○ Fairly difficult
- ○ Very difficult
- ○ Don't know/no opinion

121. At this installation, how easy or difficult has it been for you to get OB/GYN care, such as pelvic exams or Pap smears?

- ○ Very easy
- ○ Fairly easy
- ○ Fairly difficult
- ○ Very difficult
- ○ Don't know/no opinion

122. When was the last time you had a Pap test or Pap smear to check for cancer of the cervix?

- ○ Within the past year
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago but within the past 3 years
- ○ More than 3 years ago
- ○ Don't know/don't remember
- ○ Never had a Pap test

123. Have you had a hysterectomy, or operation to remove your uterus?

- ○ Yes
- ○ No

159477 2/6

124. How satisfied or dissatisfied have you been with the quality of OB/GYN care you have received at this installation?

- ○ Very satisfied
- ○ Satisfied
- ○ Dissatisfied
- ○ Very dissatisfied
- ○ Don't know/no opinion

125. In the past 12 months, how much stress did you experience as a woman in the military?

- ○ A great deal
- ○ A fairly large amount
- ○ Some
- ○ A little
- ○ None at all

126. To the best of your knowledge, when was the last time you were pregnant?

- ○ Currently pregnant
- ○ May be pregnant now, but don't know for certain
- ○ Within the past year but not now
- ○ More than 1 year ago but within the past 2 years
- ○ More than 2 years ago but within the past 5 years
- ○ More than 5 years ago
- ○ Have never been pregnant

The next set of questions refers to the last time you were pregnant. If you are currently pregnant, please answer these questions for this pregnancy. "Pregnancy checkups" refer to checkups for weight, blood pressure, physical exams, procedures such as ultrasound, or other medical procedures related to pregnancy.

127. Think about your last pregnancy (or your current pregnancy). How long after you became pregnant did you have your first pregnancy checkup?

- ○ Within the first 3 months after becoming pregnant
- ○ 4-6 months after becoming pregnant
- ○ More than 6 months after becoming pregnant
- ○ Did not have any pregnancy checkups, or have not had first checkup
- ○ Have never been pregnant

(Please continue to next column ➡)

128. During your last pregnancy (or your current pregnancy), about how often did you smoke a cigarette, even if one or two puffs?

- ○ Daily
- ○ Almost daily, or 3-6 days a week
- ○ 1-2 days a week
- ○ Several times a month (but less than once a week)
- ○ Once a month or less (but at least once)
- ○ Never smoked cigarettes during last (or current) pregnancy
- ○ Never been pregnant

129. On those days when you smoked cigarettes during your last pregnancy (or your current pregnancy), how many cigarettes would you usually smoke?

- ○ About 2 or more packs (more than 35 cigarettes)
- ○ About 1½ packs (26 to 35 cigarettes)
- ○ About 1 pack (16-25 cigarettes)
- ○ About ½ pack (6-15 cigarettes)
- ○ 1-5 cigarettes
- ○ Less than 1 cigarette, on the average
- ○ Never smoked cigarettes during last (or current) pregnancy
- ○ Never been pregnant

130. During your last pregnancy (or your current pregnancy), about how often did you drink alcoholic beverages (i.e., beer, wine, or liquor)?

- ○ Daily
- ○ Almost daily, or 3-6 days a week
- ○ 1-2 days a week
- ○ Several times a month (but less than once a week)
- ○ Once a month or less (but at least once)
- ○ Never drank alcohol during last (or current) pregnancy
- ○ Never been pregnant

131. On those days when you drank alcoholic beverages during your last pregnancy (or your current pregnancy), how many drinks would you usually have?

- ○ 5 or more drinks
- ○ 4 drinks
- ○ 3 drinks
- ○ 2 drinks
- ○ 1 drink
- ○ Less than 1 drink, on the average
- ○ Never drank alcohol during last (or current) pregnancy
- ○ Never been pregnant

THANK YOU VERY MUCH FOR TAKING THE EXTRA TIME TO COMPLETE THESE QUESTIONS. THANK YOU AS WELL FOR YOUR TIME, EFFORT, AND COOPERATION IN COMPLETING THIS ENTIRE QUESTIONNAIRE.

PLEASE PLACE THE QUESTIONNAIRE IN THE BOX AS YOU LEAVE THE ROOM.

THIS BLOCK FOR OFFICE USE ONLY

FSU

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Nucleus Installation: _____

Survey Phase

I ○ II ○

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

PUBLIC AFFAIRS

WASHINGTON, D.C. 20301-1400 22 APR 1996

Ref: 96-F-0221
96-F-0222
96-F-0223
96-F-0224

Mr. Thomas M. Sobol
Brown, Rudick, Freed & Gesmer
One Financial Center
Boston, MA 02111

Dear Mr. Sobol:

This letter responds to your February 1, 1996, Freedom of Information Act (FOIA) request to this Directorate, Office of the Under Secretary of Defense for Acquisition, Office of the Comptroller of the Department of Defense, Office of the Assistant Secretary of Defense for Health Affairs, and the Uniformed Services University of the Health Sciences.

Due to the size and complexity of the Department of Defense (DoD), there is no central repository for all DoD records. This office is responsible for responding to requests for records of the components of the Office of the Secretary of Defense (OSD) and Joint Staff (JS). The several components of the DoD, including the military departments, unified commands, and separate defense agencies, operate their own Freedom of Information offices to respond to requests for records for which they are responsible. These procedures are provided in DoD Regulation 5400.7-R, which may be found at 32 CFR 286.

The enclosed documents are provided as responsive to your request. Additionally, your request has been referred to the Defense Logistics Agency for a direct response to you. The following address pertains:

Defense Logistics Agency
Attn: Barry Christensen (DASC-D)
8725 John J. Kingman Road
Suite 0119
Fort Belvoir, VA 22060-6220

There are no chargeable costs for processing your FOIA request in this instance

Sincerely,

A. H. Passarella
Director
Freedom of Information
and Security Review

Enclosures:
As stated

#796

Cases where tobaco use disorder is listed as a diagnosis

Year	1993	1994	1995
Cases	7827	8007	3381

Cases where tobaco use disorder-in remission was listed as a diagnosis

Year	1993	1994	1995
Cases	780	419	15

#796

ORIGINAL

TOBACCO: A MONETARY BURDEN FOR THE DEPARTMENT OF DEFENSE SUSTAINED BY MILITARY SHOPPING FACILITIES

95-1542

MAY 30 1995

James L. Kretzschmar DDS, MBS
LTCOL USAF
Staff Dentist
49th Fighter Wing Hospital
Holloman AFB, NM 88330

Deborah A. Kretzschmar MD
LTCOL USAF
Staff Internist/Gastroenterologist
49th Fighter Wing Hospital
Holloman AFB, NM 88330

Sarah G. Callinan PA-C
CPT USAF
Health Promotions Manager
49th Fighter Wing Hospital
Holloman AFB, NM 88330

ADDRESS REPRINT REQUESTS TO: Dr. James L. Kretzschmar
49th Medical Group-SGD
Holloman AFB, New Mexico
88330

#790

ABSTRACT

BACKGROUND: For many years low cost tobacco products have been sold at military shopping facilities. Recent dollar figures from the Centers for Disease Control and Prevention have shown the cost of treating tobacco related medical problems to be very expensive for the United States. With the Department of Defense very interested in saving dollars and process improvements, an investigation was conducted at Holloman AFB, New Mexico with three goals. Goal #1: To determine the cost differential between purchasing tobacco products at military shopping facilities and civilian stores. Goal #2: To determine where the active duty population purchases tobacco products. Goal #3: To estimate the tobacco related medical costs for the 49th Fighter Wing Hospital.

METHODS: Price surveys were conducted at the Holloman AFB Commissary and Base Exchange and also at several civilian stores in the local area. An informal survey was conducted of active duty cigarette smokers as to where they purchase tobacco products.

The total dollar figure for tobacco sales at the Holloman AFB Commissary and Base Exchange was requested and obtained and used in the estimation of tobacco related medical costs to the 49th Fighter Wing Hospital.

RESULTS: A carton of cigarettes purchased at military shopping facilities averages $5.05 less than a civilian store. One-hundred percent of the active duty cigarette smokers surveyed purchased their tobacco products at military shopping facilities. The estimated tobacco related medical costs for the 49th Fighter Wing Hospital (a small eight bed facility) is 3.9 million dollars per year.

CONCLUSION: The availability of low cost tobacco products at military shopping facilities continues to reinforce the smoking habits of the active duty population (and other eligible beneficiaries). The very same beneficiaries utilize the military healthcare system thereby costing the Department of Defense millions of dollars every year. If low cost tobacco products were no longer available at military shopping facilities most likely a substantial savings in healthcare expenditures would be realized.

KEY WORDS: TOBACCO, SMOKING, CIGARETTES, READINESS

INTRODUCTION

In 1964 the United States Surgeon General declared that "smoking is hazardous to your health". Since that report was issued 31 years ago research has proven smoking to be a leading cause of pulmonary and cardiovascular disease.(1,2) Recent research has shown an association between smoking and cancer of the esophagus, stomach, pancreas, bladder, and cervix.(1,3) Research has also shown smokers to have 2 to 4 times the risk of developing Crohn's disease, and also an increased susceptibility to common colds.(2,3) In 1994 the United States Center for Disease Control and Prevention (CDC) reported smoking to be an economic burden for this country. As healthcare reform continues to evolve in the United States the monetary impact of treating smoking related medical conditions will certainly be a highly discussed topic. The military may be involved in these discussions as it continues to search for ways to save dollars.

TOBACCO RELATED MEDICAL COSTS

The dollar figures released in the CDC 1994 report are astonishing. Approximately $50 billion a year in medical costs are directly related to smoking.(4) This equates to approximately $2.06 for every pack of cigarettes sold (24 billion packs of cigarettes were sold in the U.S. in 1993).(4)

Approximately 43% of this $50 billion cost ($21.6 billion) was paid for by the taxpayers, nonsmokers as well as smokers.(4) Healthcare costs are high and continue to rise as military hospitals and clinics struggle to meet the healthcare demands of beneficiaries. Shrinking budgets and decreasing personnel make this a difficult challenge. With tobacco use identified as a contributing factor in many disease processes it would be prudent for the military to attempt to reduce tobacco use by eligible beneficiaries. This could save dollars by decreasing patient visits to military healthcare facilities. Providers in military hospitals and clinics make heroic efforts at great expense to treat disease brought about by the use of tobacco, yet another part of the military continues to fuel patients' addiction to tobacco by offering low cost tobacco products at military shopping facilities. In the present era of process improvement initiatives, the opportunity exists for the military to save millions of healthcare dollars by correcting this counter productive situation.

As military healthcare providers, we see the entire spectrum of the effects of smoking. This spectrum ranges from the teenage recruit smoker with several colds/influenzas a year unable to

pass the annual physical fitness test, to the middle aged mid-career smoker with hypertension and periodontal disease, and after many years of smoking, the retiree who presents with advanced pulmonary disease relying on supplemental oxygen.(5,6) Many of these medical problems are directly attributable to smoking, and can be prevented. The cost of managing these ailments continues to rise. In addition, there is also an indirect cost associated with treating these preventable medical conditions. Smokers are absent from work approximately 6.5 days more per year, and make about six visits more per year to healthcare facilities than nonsmokers.(7) Lost productivity due to sickcall visits, quarters, hospitalizations, and convalescent leave cannot be ignored when calculating the expense of treating tobacco related medical problems, and assessing the readiness posture of military units.

TOBACCO USAGE AND PRICE SURVEYS

The annual Air Force anti-tobacco survey was conducted at Holloman AFB, New Mexico in December 1994. The results of the survey showed that 23.9% of the active duty population used tobacco products: 18.6% (918/4934) smoked, and 5.3% (261/4934) used smokeless tobacco. With almost one-fourth of the active duty population using tobacco products an informal survey

of cigarette smokers was conducted to find out where active duty smokers buy their cigarettes. Of the twenty-five active duty cigarette smokers surveyed 100% purchased their tobacco products at on base shopping facilities. A second survey was conducted to determine the cost difference in the price between tobacco products in military shopping facilities versus civilian stores. Taking the average of four civilian stores in this area (southern New Mexico) the cost of one carton of cigarettes of the most expensive brand was $15.56 compared to $10.90 at the commissary and base exchange. The average cost of one carton of cigarettes of the least expensive brand was $11.08 off base and $5.65 on base. A price difference of $4.66 per carton for the most expensive brand of cigarettes and a difference of $5.43 per carton for the least expensive brand of cigarettes. A carton of cigarettes purchased at military shopping facilities averages $5.05 less than in a civilian store. A survey of smokeless tobacco prices showed similar results. For ten cans of smokeless tobacco the on base price was $22.00 and the off base price was $32.20. Because of the substantial cost savings, it is safe to assume that not only active duty tobacco users, but also tobacco using dependents and retirees purchase tobacco products at military shopping facilities.

ESTIMATED TOBACCO RELATED MEDICAL COSTS

FOR THE 49TH FIGHTER WING HOSPITAL

The combined sales (commissary and base exchange) of tobacco products at Holloman AFB in 1994 totaled $1,579,343. Applying the CDC's $2.06 per pack of cigarettes figure for smoking related medical costs it is possible to make an estimation of the cost of treating smoking related medical problems to the 49th Fighter Wing Hospital at Holloman AFB, New Mexico. Taking the average price of one carton of cigarettes at military shopping facilities as $8.27 ($10.90 + $5.65/2=$8.27) and dividing this figure into $1,579,343 an estimated 190,972 cartons of cigarettes were sold. Multiplying the number of cartons by 10 yields an estimated 1,909,720 packs of cigarettes. Multiplying the number of packs by the CDC's $2.06 figure gives $3,934,034 for the estimated dollar figure for the smoking related medical costs to the 49th Fighter Wing Hospital. The active duty population most likely has not yet reached the point in their lives where smoking has created severe medical problems. However, the 49th Fighter Wing Hospital provides healthcare for not only the active duty population, but also the 22,000 eligible retired and dependent beneficiaries in the area. A figure of this magnitude ($3,934,034) cannot

be ignored when the Department of Defense is searching for increased savings of healthcare dollars.

CONCLUSION

If the estimated tobacco related medical costs is 3.9 million dollars for one small military hospital, many millions of dollars are probably spent throughout the Department of Defense. A decrease in the use of tobacco products by recipients of military healthcare may be realized if inexpensive tobacco products were no longer available at military shopping facilities. This probably would result in a decrease in visits to medical treatment facilities and ultimately save dollars. Antismoking programs conducted by health promotions staffs of military hospitals and clinics would no longer be undermined by the low prices of tobacco products available at military shopping facilities. The greatest motivation for change for individuals as well as organizations is the effect on the pocketbook. The Department of Defense could be the big winner by the elimination of the sale of tobacco products at all military shopping facilities. The potential exists to save millions of healthcare dollars with the overall outcome of a healthier military force and beneficiary population.

REFERENCES

1. Bartecchi CE, MacKenzie TD, Schrier RW: Human Costs of Tobacco Use (First of Two Parts). The New England Journal of Medicine 1994; 330: 907-912.

2. Gunby P: Medical News and Perspective: "Statisticians Offer Overall Incidence Estimates for Various Kinds of Cancer During This Year". JAMA 1993; 269:1611.

3. Bockus HL, Gastroenterology 5th Edition, pp 1301,1323,2987, Philadelphia, W.B. Saunders Company, 1995.

4. Bartlett JC, Miller LS, Rice DP, et al: Medical-Care Expenditures Attributable to Cigarette Smoking---United States, 1993. JAMA 1994; 272: 428-9.

5. Mandel I: Smoke Signals: An Alert for Oral Disease. J. American Dental Association 1994; 125:872-878.

6. McGinnis JM, Foege WH: Actual Causes of Death in the United States. JAMA 1993; 270: 2207-2212.

7. Bartecchi CE, MacKenzie TD, Schrier RW: Human Costs of Tobacco Use (Second of Two Parts). The New England Journal of Medicine 1994; 330: 975-980.