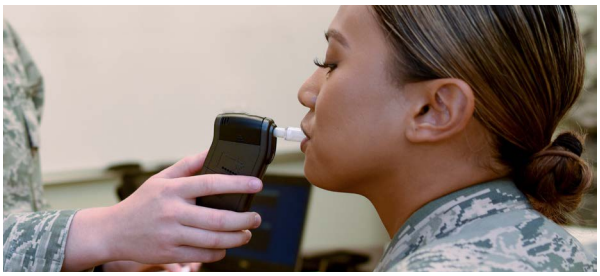
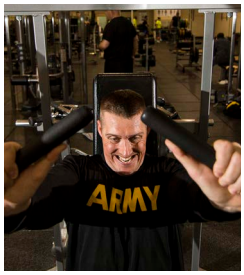
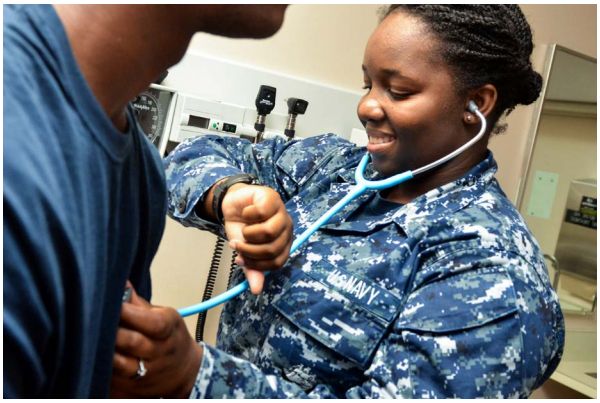
SARAH O. MEADOWS, CHARLES C. ENGEL, REBECCA L. COLLINS, ROBIN L. BECKMAN, JOSHUA BRESLAU, ERIKA LITVIN BLOOM, MICHAEL STEPHEN DUNBAR, MARY LOU GILBERT, DAVID GRANT, JENNIFER HAWES-DAWSON, STEPHANIE BROOKS HOLLIDAY, SARAH MACCARTHY, ERIC R. PEDERSEN, MICHAEL W. ROBBINS, ADAM J. ROSE, JAMIE RYAN, TERRY L. SCHELL, MOLLY M. SIMMONS

2018 Department of Defense Health Related Behaviors Survey (HRBS)

Results for the Reserve Component







For more information on this publication, visit www.rand.org/t/RR4228

This report was updated in July 2026 to correct a coding error that impacted calculations of the prevalence of probable PTSD.

Published by the RAND Corporation, Santa Monica, Calif.
© Copyright 2021 RAND Corporation
RAND® is a registered trademark.

Cover image sources, clockwise from top left:
Lance Cpl. Ricardo Davila/U.S. Marine Corps;
Airman 1st Class Abbey Rieves/U.S. Air Force; Petty Officer 1st Class
Jacob Sippel/U.S. Navy; Master Sgt. Michel Sauret/U.S. Army Reserve;
Courtesy photo/U.S. Coast Guard.

Limited Print and Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited. Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Permission is required from RAND to reproduce, or reuse in another form, any of its research documents for commercial use. For information on reprint and linking permissions, please visit www.rand.org/pubs/permissions.

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

Support RAND
Make a tax-deductible charitable contribution at
www.rand.org/giving/contribute

www.rand.org

Preface

The Health Related Behaviors Survey (HRBS) is the U.S. Department of Defense's flagship survey for understanding the health, health-related behaviors, and well-being of service members. Originally implemented to assess substance use (i.e., illicit drugs, alcohol, and tobacco), the survey now includes content areas—such as mental and physical health, sexual behavior, and postdeployment problems—that may affect force readiness or the ability to meet the demands of military life. The HRBS is intended to supplement administrative data already collected by the armed forces.

In 2016, the Defense Health Agency asked the RAND Corporation to review previous iterations of the HRBS, update survey content, administer a revised version of the survey, and analyze data from the resulting 2018 HRBS. The 2018 HRBS included U.S. Air Force, Army, Marine Corps, Navy, and Coast Guard personnel in both the active and reserve components, and this report details the survey methodology and results for the reserve component. A separate report details the survey methodology and results for the active component. No expertise in health, health-related behaviors, or health care is required to read this report. However, this report might be of most use to individuals who provide direct care related to the health and health-related behaviors of active-duty service members or who are responsible for making related policy decisions.

The research reported here was completed in February 2020 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

This research was sponsored by the Defense Health Agency and conducted within the Forces and Resources Policy Center of the RAND National Security Research Division (NSRD), which operates the National Defense Research Institute (NDRI), a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense intelligence enterprise.

For more information on the RAND Forces and Resources Policy Center, see www.rand.org/nsrd/frp or contact the director (contact information is provided on the webpage).

Contents

Preface iii
Figures and Tables ix
Summary xvii
Acknowledgments xli
Abbreviations xliii

CHAPTER ONE
Introduction 1
Context for the 2018 Health Related Behaviors Survey 2
Comparison with the 2018 HRBS Active Component Sample 4
Organization of the Report 5

CHAPTER TWO
Methodology 7
Survey Development 7
Survey Administration 8
Population and Sample 10
Analytic Weights 21
Missing Data and Imputation 25
Analysis Approach 26
Limitations 29

CHAPTER THREE
Demographics 31
Service Branch, Pay Grade, and Gender 31
Age 33
Race/Ethnicity 35
Education 36
Marital Status 38
Parental (or Dependent) Status 39
Housing Status 40
Employment Status 41
Overall Sample Description 43
Summary 43

CHAPTER FOUR
Health Promotion and Disease Prevention 45
Weight Status 46
Physical Activity 49
Screen Time 56
Annual Physical Assessment 59
Insurance Status 61
Sleep Health 64
Comparisons with the 2018 HRBS Active Component Sample 80
Summary 84

CHAPTER FIVE
Substance Use 87
Alcohol 88
Tobacco 97
Marijuana Use and Drug Use 106
Prescription Drug Use 113
Prescription Drug Misuse 116
Comparisons with the 2018 HRBS Active Component Sample 119
Summary 123

CHAPTER SIX
Mental and Emotional Health 125
Mental Health Status 126
Posttraumatic Stress Disorder 129
Social and Emotional Factors Associated with Mental Health 132
Suicide 140
Problematic Gambling 144
Mental Health Services 147
Comparisons with the 2018 HRBS Active Component Sample 162
Summary 166

CHAPTER SEVEN
Physical Health and Functional Limitations 169
Chronic Conditions 170
Physical Symptoms 174
Traumatic Brain Injury and Postconcussive Symptoms 178
Self-Rated Health 182
Health-Related Functional Limitations 185
Comparisons with the 2018 HRBS Active Component Sample 187
Summary 190

CHAPTER EIGHT
Sexual Behavior and Health 193
Sexual Risk Behaviors and Outcomes 194
Contraceptive Use and Methods 198

Deployment-Related Unintended Pregnancy, Contraceptive Access and Counseling 205
HIV Testing 209
Comparisons with the 2018 HRBS Active Component Sample 213
Summary 216

CHAPTER NINE
Sexual Orientation and Health 219
Sexual Orientation 220
LGB Health Promotion and Disease Prevention 223
LGB Substance Use 224
LGB Mental Health and Mental Health Services Use 225
LGB Physical Health 227
LGB Unwanted Sexual Contact and Physical Abuse 227
LGB Sexual and Reproductive Health 228
Comparisons with the 2018 HRBS Active Component Sample 229
Summary 235

CHAPTER TEN
Deployment Experiences and Health 237
Frequency and Duration of Combat and Noncombat Deployments 237
Deployment Experiences and Health 250
Summary 256

CHAPTER ELEVEN
Summary and Policy Implications 259
Health Promotion and Disease Prevention 259
Substance Use 260
Mental and Emotional Health 261
Physical Health and Functional Limitations 262
Sexual Behavior and Health 263
Sexual Orientation and Health 264
Deployment Experiences and Health 265
Comparisons with Healthy People 2020 Goals 266
Comparisons with the 2018 HRBS Active Component Sample 268
Policy Implications and Recommendations 271
Conclusion 279

APPENDIXES
A. 2018 DoD Health Related Behaviors Survey 281
B. Invitation Letter and Letters of Support 321
C. Description of Measures Used in the 2018 DoD Health Related Behaviors Survey 329
D. Key Outcomes by Race/Ethnicity and Age Group 343
E. Missing Data and Imputation Method Detail 399

References 405

Figures and Tables

Figures

1.1. Eight Domains of Total Force Fitness 3
2.1. Flowchart for the 2018 HRBS Final Analytic Sample 13

Tables

S.1. Distribution of Service Branch, Pay Grade, and Gender in the 2018 HRBS Reserve Component Weighted Respondent Sample, with 2017 DoD Comparison xxii
S.2. Comparison of 2018 HRBS Reserve Component with HP2020 Goals for Select Outcomes xxx
S.3. Significant Differences Between the Active and Reserve Components for Select Outcomes xxxi
2.1. 2018 Health Related Behaviors Survey Sampling Frame 12
2.2. Sampling Frame, Sample Size, and Response Rates, Overall Sample 14
2.3. Sample Size and Response Rates, Air Force Reserve 15
2.4. Sample Size and Response Rates, Air National Guard 16
2.5. Sample Size and Response Rates, Army Reserve 17
2.6. Sample Size and Response Rates, Army National Guard 18
2.7. Sample Size and Response Rates, Marine Corps Reserve 19
2.8. Sample Size and Response Rates, Navy Reserve 20
2.9. Sample Size and Response Rates, Coast Guard Reserve 21
2.10. Balance Table for Nonresponse Weights 23
3.1. Distribution of Service Branch, Pay Grade, and Gender in the 2018 HRBS Reserve Component Weighted Respondent Sample, with 2017 DoD Comparison 32
3.2. Pay Grade by Service Branch, Weighted Respondent Sample 33
3.3. Gender by Pay Grade, Weighted Respondent Sample 33
3.4. Age Groups by Service Branch, Weighted Respondent Sample 34
3.5. Age Groups by Pay Grade, Weighted Respondent Sample 34
3.6. Age Groups by Gender, Weighted Respondent Sample 34
3.7. Race/Ethnicity by Service Branch, Weighted Respondent Sample 35
3.8. Race/Ethnicity by Pay Grade, Weighted Respondent Sample 35
3.9. Race/Ethnicity by Gender, Weighted Respondent Sample 36

3.10. Education Level by Service Branch, Weighted Respondent Sample....37
3.11. Education Level by Pay Grade, Weighted Respondent Sample....37
3.12. Education Level by Gender, Weighted Respondent Sample....37
3.13. Marital Status by Service Branch, Weighted Respondent Sample....38
3.14. Marital Status by Pay Grade, Weighted Respondent Sample....38
3.15. Marital Status by Gender, Weighted Respondent Sample....39
3.16. Dependent Status by Service Branch, Weighted Respondent Sample....39
3.17. Dependent Status by Pay Grade, Weighted Respondent Sample....39
3.18. Dependent Status by Gender, Weighted Respondent Sample....40
3.19. Housing Status by Service Branch, Weighted Respondent Sample....40
3.20. Housing Status by Pay Grade, Weighted Respondent Sample....41
3.21. Housing Status by Gender, Weighted Respondent Sample....41
3.22. Employment Status by Service Branch, Weighted Respondent Sample....42
3.23. Employment Status by Pay Grade, Weighted Respondent Sample....42
3.24. Employment Status by Gender, Weighted Respondent Sample....42
3.25. Overall Weighted Sample Description....43
4.1. Weight Status, by Service Branch....47
4.2. Weight Status, by Pay Grade....48
4.3. Weight Status, by Gender....49
4.4. Physical Activity Past 30 Days, by Service Branch....51
4.5. Physical Activity Past 30 Days, by Pay Grade....52
4.6. Physical Activity Past 30 Days, by Gender....53
4.7. Past-30-Day Strength Training, by Service Branch....54
4.8. Strength Training in Past 30 Days, by Pay Grade....55
4.9. Strength Training in Past 30 Days, by Gender....56
4.10. Hours per Day of Screen Time by Service Branch....57
4.11. Hours per Day of Screen Time, by Pay Grade....58
4.12. Hours per Day of Screen Time, by Gender....58
4.13. Past-Year Routine Medical Checkup, by Service Branch....60
4.14. Past-Year Routine Medical Checkup, by Pay Grade....61
4.15. Past-Year Routine Medical Checkup, by Gender....61
4.16. Current Health Insurance, by Service Branch....62
4.17. Current Health Insurance, by Pay Grade....63
4.18. Current Health Insurance, by Gender....64
4.19. Past 30 Days Average Daily Hours of Sleep, by Service Branch....66
4.20. Past 30 Days Average Daily Hours of Sleep, by Pay Grade....67
4.21. Past 30 Days Average Daily Hours of Sleep, by Gender....67
4.22. Sleep Quality in Past 30 Days, by Service Branch....69
4.23. Sleep Quality in Past 30 Days, by Pay Grade....70
4.24. Sleep Quality in Past 30 Days, by Gender....70
4.25. Moderate to Severe Lack of Energy Due to Poor Sleep, by Service Branch....71
4.26. Lack of Energy Due to Poor Sleep in the Past Week, by Pay Grade....72
4.27. Lack of Energy Due to Poor Sleep in the Past Week, by Gender....72
4.28. Past-30-Day Use of Sleep Medication, by Service Branch....73
4.29. Past-30-Day Use of Sleep Medication, by Pay Grade....74
4.30. Past-30-Day Use of Sleep Medication, by Gender....74
4.31. Past-30-Day Use of Substances to Stay Awake, by Service Branch....76
4.32. Past-30-Day Use of Substances to Stay Awake, by Pay Grade....78
4.33. Past-30-Day Use of Substances to Stay Awake, by Gender....79

4.34. Rates of Health Promotion and Disease Prevention Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics ... 81
5.1. Alcohol Use in Past 30 Days, by Service Branch ... 90
5.2. Alcohol Use in Past 30 Days, by Pay Grade ... 91
5.3. Alcohol Use in Past 30 Days, by Gender ... 91
5.4. Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Service Branch ... 92
5.5. Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Pay Grade ... 93
5.6. Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Gender ... 93
5.7. Perception of Military Drinking Culture, by Service Branch ... 95
5.8. Perception of Military Drinking Culture, by Pay Grade ... 96
5.9. Perception of Military Drinking Culture, by Gender ... 96
5.10. Current Tobacco Use, by Service Branch ... 98
5.11. Current Tobacco Use, by Pay Grade ... 99
5.12. Current Tobacco Use, by Gender ... 100
5.13. Past-Year Smoking Cessation Attempts Among Current Smokers, by Service Branch ... 102
5.14. Past-Year Smoking Cessation Attempts Among Current Smokers, by Pay Grade ... 103
5.15. Past-Year Smoking Cessation Attempts Among Current Smokers, by Gender ... 103
5.16. Reasons for E-Cigarette Use, by Service Branch ... 104
5.17. Reasons for E-Cigarette Use, by Pay Grade ... 105
5.18. Reasons for E-Cigarette Use, by Gender ... 105
5.19. Past-Year Drug Use, by Service Branch ... 107
5.20. Past-Year Drug Use, by Pay Grade ... 108
5.21. Past-Year Drug Use, by Gender ... 108
5.22. Past-30-Day Drug Use, by Service Branch ... 111
5.23. Past-30 Day Drug Use, by Pay Grade ... 112
5.24. Past-30-Day Drug Use, by Gender ... 112
5.25. Past-Year Prescription Drug Use, by Service Branch ... 114
5.26. Past-Year Prescription Drug Use, by Pay Grade ... 115
5.27. Past-Year Prescription Drug Use, by Gender ... 115
5.28. Past-Year Prescription Drug Misuse, by Service Branch ... 117
5.29. Past-Year Prescription Drug Misuse, by Pay Grade ... 118
5.30. Past-Year Prescription Drug Misuse, by Gender ... 118
5.31. Rates of Substance Use in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics ... 120
6.1. Serious Psychological Distress, by Service Branch ... 127
6.2. Serious Psychological Distress, by Pay Grade ... 128
6.3. Serious Psychological Distress, by Gender ... 128
6.4. Probable PTSD, by Service Branch ... 130
6.5. Probable PTSD, by Pay Grade ... 131
6.6. Probable PTSD, by Gender ... 131
6.7. Angry and Aggressive Behaviors, by Service Branch ... 133
6.8. Angry and Aggressive Behaviors, by Pay Grade ... 134
6.9. Angry and Aggressive Behaviors, by Gender ... 134
6.10. Unwanted Sexual Contact, by Service Branch ... 136

6.11. Unwanted Sexual Contact, by Pay Grade 137
6.12. Unwanted Sexual Contact, by Gender 137
6.13. Physical Assault, by Service Branch 139
6.14. Physical Assault, by Pay Grade 140
6.15. Physical Assault, by Gender 140
6.16. Suicide, by Service Branch 142
6.17. Suicide, by Pay Grade 143
6.18. Suicide, by Gender 143
6.19. Past-Year Gambling Problem, by Service Branch 145
6.20. Past-Year Gambling Problem, by Pay Grade 146
6.21. Past-Year Gambling Problem, by Gender 146
6.22. Past-Year Mental Health Service Utilization, by Service Branch 150
6.23. Past-Year Mental Health Service Utilization, by Pay Grade 152
6.24. Past-Year Mental Health Service Utilization, by Gender 153
6.25. Past-Year Mental Health Medication Use, by Service Branch 154
6.26. Past-Year Mental Health Medication Use, by Pay Grade 155
6.27. Past-Year Mental Health Medication Use, by Gender 155
6.28. Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Service Branch 156
6.29. Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Pay Grade 157
6.30. Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Gender 157
6.31. Perceived Unmet Need for Mental Health Services, by Service Branch 158
6.32. Perceived Unmet Need for Mental Health Services, by Pay Grade 159
6.33. Perceived Unmet Need for Mental Health Services, by Gender 159
6.34. Reasons for Not Receiving Needed Treatment for Mental Health Problems in the Past Year 160
6.35. Perception That Seeking Mental Health Treatment Would Damage Military Career, by Service Branch 161
6.36. Perception That Seeking Mental Health Treatment Would Damage Military Career, by Pay Grade 162
6.37. Perception That Seeking Mental Health Treatment Would Damage Military Career, by Gender 162
6.38. Rates of Mental Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics 163
7.1. Past-Year Physician-Diagnosed Chronic Conditions, by Service Branch 171
7.2. Past-Year Physician-Diagnosed Chronic Conditions, by Pay Grade 172
7.3. Past-Year Physician-Diagnosed Chronic Conditions, by Gender 173
7.4. Bothered a Lot by Physical Symptoms in the Past 30 Days, by Service Branch 176
7.5. Bothered a Lot by Physical Symptoms in the Past 30 Days, by Pay Grade 177
7.6. Bothered a Lot by Physical Symptoms in the Past 30 Days, by Gender 178
7.7. Past-Year Injury, TBI, and Postconcussive Symptoms, by Service Branch 180
7.8. Past-Year Injury, TBI, and Postconcussive Symptoms, by Pay Grade 181
7.9. Past-Year Injury, TBI, and Postconcussive Symptoms, by Gender 181
7.10. Self-Rated Overall Physical Health, by Service Branch 183
7.11. Self-Rated Overall Physical Health, by Pay Grade 184
7.12. Self-Rated Overall Physical Health, by Gender 184

7.13. Health-Related Functional Limitations: Absenteeism and Presenteeism, by Service Branch 186
7.14. Health-Related Functional Limitations: Absenteeism and Presenteeism, by Pay Grade 187
7.15. Health-Related Functional Limitations: Absenteeism and Presenteeism, by Gender 187
7.16. Rates of Physical Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics 188
8.1. Past-Year Sexual Risk Behaviors and Outcomes, by Service Branch 196
8.2. Past-Year Sexual Risk Behaviors and Outcomes, by Pay Grade 197
8.3. Past-Year Sexual Risk Behaviors and Outcomes, by Gender 198
8.4. Method of Contraception Used During Most-Recent Vaginal Sex in Past Year 199
8.5. Method of Contraception, by Service Branch 200
8.6. Method of Contraception, by Pay Grade 201
8.7. Method of Contraception, by Gender 202
8.8. HP2020 Outcomes, by Service Branch 204
8.9. Deployment-Related Contraceptive Counseling and Access (Women Only), by Service Branch 206
8.10. Deployment-Related Contraceptive Counseling and Access (Women Only), by Pay Grade 207
8.11. Deployment-Related Contraceptive Counseling and Access (Men Only), by Service Branch 208
8.12. Deployment-Related Contraceptive Counseling and Access (Men Only), by Pay Grade 209
8.13. HIV Testing, by Service Branch 210
8.14. HIV Testing, by Pay Grade 212
8.15. HIV Testing, by Gender 212
8.16. Sexual Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics 214
9.1. Sexual Orientation, by Gender 220
9.2. LGB Identity, by Service Branch 222
9.3. LGB Identity, by Pay Grade 223
9.4. Health Promotion and Disease Prevention, by LGB Identity 223
9.5. Substance Use, by LGB Identity 224
9.6. Mental and Emotional Health and Mental Health Services Use, by LGB Identity 226
9.7. Physical Health, by LGB Identity 227
9.8. Unwanted Sexual Contact and Physical Abuse, by LGB Identity 228
9.9. Sexual and Reproductive Health, by LGB Identity 229
9.10. Rates of Selected Health Behaviors and Outcomes for LGB Service Members in the Reserve Component Relative to LGB Service Members in the Active Component, Unadjusted and Adjusted for Service Member Characteristics 230
10.1. Lifetime Number of Deployments, by Service Branch 238
10.2. Lifetime Number of Deployments, by Pay Grade 239
10.3. Lifetime Number of Deployments, by Gender 239
10.4. Lifetime Number of Combat Zone Deployments, by Service Branch 241
10.5. Lifetime Number of Combat Zone Deployments, by Pay Grade 242
10.6. Lifetime Number of Combat Zone Deployments, by Gender 242
10.7. Lifetime Duration of Deployments, by Service Branch 243
10.8. Lifetime Duration of Deployments, by Pay Grade 244

10.9. Lifetime Duration of Deployments, by Gender 244
10.10. Total Duration of Deployments in the Past 12 Months, by Service Branch 246
10.11. Total Duration of Deployments in the Past 12 Months, by Pay Grade 247
10.12. Total Duration of Deployments in the Past 12 Months, by Gender 247
10.13. Lifetime Combat Trauma Experiences During Deployment, by Service Branch 249
10.14. Lifetime Combat Trauma Experiences During Deployment, by Pay Grade 250
10.15. Lifetime Combat Trauma Experiences During Deployment, by Gender 251
10.16. Substance Use, by Recent Deployment 252
10.17. Mental and Emotional Health Indicators, by Recent Deployment 254
10.18. Physical Health, by Any Deployment in Past 12 Months 255
11.1. Comparison of 2018 HRBS Reserve Component with HP2020 Goals for Select Outcomes 267
11.2. Significant Differences Between the Active and Reserve Components for Select Outcomes 269
D.1. Weight Status, by Race/Ethnicity 343
D.2. Weight Status, by Age Group 344
D.3. Physical Activity Last 30 Days, by Race/Ethnicity 345
D.4. Physical Activity Last 30 Days, by Age Group 346
D.5. Strength Training in Past 30 Days, by Race/Ethnicity 347
D.6. Strength Training in Past 30 Days, by Age Group 348
D.7. Hours per Day of Screen Time, by Race/Ethnicity 348
D.8. Hours per Day of Screen Time, by Age Group 349
D.9. Past-Year Routine Medical Checkup, by Race/Ethnicity 349
D.10. Past-Year Routine Medical Checkup, by Age Group 349
D.11. Current Health Insurance, by Race/Ethnicity 350
D.12. Current Health Insurance, by Age Group 350
D.13. Past-30-Days Average Daily Hours of Sleep, by Race/Ethnicity 351
D.14. Past-30-Days Average Daily Hours of Sleep, by Age Group 352
D.15. Past-30-Day Sleep Quality, by Race/Ethnicity 352
D.16. Past-30-Day Sleep Quality, by Age Group 353
D.17. Moderate to Severe Lack of Energy Due to Poor Sleep, by Race/Ethnicity 353
D.18. Moderate to Severe Lack of Energy Due to Poor Sleep, by Age Group 353
D.19. Past-30-Day Use of Sleep Medication, by Race/Ethnicity 354
D.20. Past-30-Day Use of Sleep Medication, by Age Group 354
D.21. Past-30-Day Use of Medications to Stay Awake, by Race/Ethnicity 355
D.22. Past-30-Day Use of Medications to Stay Awake, by Age Group 356
D.23. Alcohol Use in Past 30 Days, by Race/Ethnicity 357
D.24. Alcohol Use in Past 30 Days, by Age Group 357
D.25. Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Race/Ethnicity 358
D.26. Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Age Group 358
D.27. Perception of Military Drinking Culture, by Race/Ethnicity 358
D.28. Perception of Military Drinking Culture, by Age Group 359
D.29. Current Tobacco Use, by Race/Ethnicity 359
D.30. Current Tobacco Use, by Age Group 360
D.31. Past-Year Smoking Cessation Attempts Among Current Smokers, by Race/Ethnicity 360
D.32. Past-Year Smoking Cessation Attempts Among Current Smokers, by Age Group 361

D.33. Reasons for E-Cigarette Use, by Race/Ethnicity 361
D.34. Reasons for E-Cigarette Use, by Age Group 362
D.35. Past Year Drug Use, by Race/Ethnicity 362
D.36. Past-Year Drug Use, by Age Group 363
D.37. Past-30-Day Drug Use, by Race/Ethnicity 363
D.38. Past-30-Day Drug Use, by Age Group 364
D.39. Past-Year Prescription Drug Use, by Race/Ethnicity 364
D.40. Past-Year Prescription Drug Use, by Age Group 365
D.41. Past-Year Prescription Drug Misuse, by Race/Ethnicity 365
D.42. Past-Year Prescription Drug Misuse, by Age Group 366
D.43. Serious Psychological Distress, by Race/Ethnicity 366
D.44. Serious Psychological Distress, by Age 366
D.45. Probable PTSD, by Race/Ethnicity 367
D.46. Probable PTSD, by Age 367
D.47. Angry and Aggressive Behaviors, by Race/Ethnicity 367
D.48. Angry and Aggressive Behaviors, by Age 368
D.49. Unwanted Sexual Contact, by Race/Ethnicity 368
D.50. Unwanted Sexual Contact, by Age 368
D.51. Physical Assault, by Race/Ethnicity 369
D.52. Physical Assault, by Age 369
D.53. Suicide, by Race/Ethnicity 370
D.54. Suicide, by Age 370
D.55. Past-Year Gambling Problem, by Race/Ethnicity 371
D.56. Past-Year Gambling Problem, by Age 371
D.57. Past-Year Mental Health Service Utilization, by Race/Ethnicity 372
D.58. Past-Year Mental Health Service Utilization, by Age 373
D.59. Past-Year Mental Health Medication Use, by Race/Ethnicity 373
D.60. Past-Year Mental Health Medication Use, by Age 374
D.61. Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Race/Ethnicity 374
D.62. Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Age 374
D.63. Perceived Unmet Need for Mental Health Services, by Race/Ethnicity 375
D.64. Perceived Unmet Need for Mental Health Services, by Age 375
D.65. Perception That Seeking Mental Health Treatment Would Damage Military Career, by Race/Ethnicity 375
D.66. Perception That Seeking Mental Health Treatment Would Damage Military Career, by Age 376
D.67. Past-Year Physician-Diagnosed Chronic Conditions, by Race/Ethnicity 377
D.68. Past-Year Physician-Diagnosed Chronic Conditions, by Age Group 378
D.69. Bothered a Lot by Physical Symptoms in the Past 30 Days, by Race/Ethnicity 379
D.70. Bothered a Lot by Physical Symptoms in the Past 30 Days, by Age Group 380
D.71. Past-Year Injury, TBI, and Postconcussive Symptoms, by Race/Ethnicity 381
D.72. Past-Year Injury, TBI, and Postconcussive Symptoms, by Age Group 381
D.73. Self-Rated Overall Physical Health, by Race/Ethnicity 382
D.74. Self-Rated Overall Physical Health, by Age Group 382
D.75. Health-Related Functional Limitations: Absenteeism and Presenteeism, by Race/Ethnicity 383

D.76. Health-Related Functional Limitations: Absenteeism and Presenteeism, by Age Group 383
D.77. Past-Year Sexual Risk Behaviors and Outcomes, by Race/Ethnicity 384
D.78. Past-Year Sexual Risk Behaviors and Outcomes, by Age Group 385
D.79. Method of Contraception, by Race/Ethnicity 386
D.80. Method of Contraception, by Age Group 387
D.81. Deployment-Related Contraceptive Counseling and Access (Women Only), by Race/Ethnicity 387
D.82. Deployment-Related Contraceptive Counseling and Access (Women Only), by Age Group 388
D.83. Deployment-Related Contraceptive Counseling and Access (Men Only), by Race/Ethnicity 388
D.84. Deployment-Related Contraceptive Counseling and Access (Men Only), by Age Group 389
D.85. HIV Testing, by Race/Ethnicity 389
D.86. HIV Testing, by Age Group 390
D.87. LGB Identity, by Race/Ethnicity 390
D.88. LGB Identity, by Age Group 391
D.89. Lifetime Number of Deployments, by Race/Ethnicity 391
D.90. Lifetime Number of Deployments, by Age Group 392
D.91. Lifetime Number of Combat Zone Deployments, by Race/Ethnicity 392
D.92. Lifetime Number of Combat Zone Deployments, by Age Group 393
D.93. Lifetime Duration of Deployments, by Race/Ethnicity 393
D.94. Lifetime Duration of Deployments, by Age Group 394
D.95. Total Duration of Deployments in the Past 12 Months, by Race/Ethnicity 394
D.96. Total Duration of Deployments in the Past 12 Months, by Age Group 395
D.97. Lifetime Combat Trauma Experiences During Deployment, by Race/Ethnicity 396
D.98. Lifetime Combat Trauma Experiences During Deployment, by Age Group 397
E.1. Q61_2: In the Past 12 Months, Were You Wounded by a Bullet? 400
E.2. Q95: In the Past 12 Months, Have You Ever Had to Lie to People Important to You About How Much You Gambled? 400
E.3. Correlation Summary (in Terms of) Across Imputation Methods 401
E.4. Q40A: In the Past 12 Months, Have You Used Marijuana or Hashish? 402
E.5. Q95: In the Past 12 Months, Have You Ever Had to Lie to People Important to You About How Much You Gambled? (Marginal Distributions) 402
E.6. Correlation Summary for Convergence Diagnostics 403

Summary

The Health Related Behaviors Survey (HRBS) is the U.S. Department of Defense's (DoD's) flagship survey for understanding the health, health-related behaviors, and well-being of service members. The survey includes content areas that may negatively impact force readiness and prevent service members from being able to perform their duties and accomplish their missions. The Defense Health Agency asked the RAND Corporation to review previous iterations of the HRBS, update survey content, administer a revised version of the survey, and analyze data from the resulting 2018 HRBS of both active and reserve component personnel in the U.S. Air Force, Army, Marine Corps, Navy, and Coast Guard.

This report, one of two complementary publications, reviews survey methodology, sample demographics, key findings among reserve component personnel,[1] and policy implications for both force readiness and future iterations of the HRBS. Key health outcomes and health-related behaviors in the report are organized around the following domains: health promotion and disease prevention, substance use, mental and emotional health, physical health and functional limitations, sexual behavior and health, sexual orientation and health, and deployment experiences and health.

Methodology

Survey Development

Though largely similar to the 2015 HRBS (Meadows et al., 2018), the 2018 HRBS benefited from further refinement to reduce respondent burden; remove items that have infrequently been used in analysis of the data; and utilize existing, validated measures that facilitate comparisons with civilian populations. Because of these changes, however, some comparisons of items over time or across HRBSs might not be appropriate. Our ultimate goal was to create a survey that met the wide-ranging needs of a large group of key stakeholders (e.g., senior DoD leaders, practitioners, commanders) but that did not duplicate already-existing data and did not present a heavy burden on service members who completed it. The final survey can be found in Appendix A, and a description of the measures used in this report can be found in Appendix C.

Two other important changes were made between the most recent HRBS, fielded in late 2015 through early 2016, and the 2018 HRBS. First, because the 2018 survey was fielded

[1] In this report, the reserve component refers to members of the Selected Reserve in the Air Force Reserve, Army Reserve, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve, as well as members of the Air National Guard and Army National Guard. A complementary report presents findings for the active component (Meadows et al., 2021).

among both the active and reserve components, the 2018 survey focused on service members in the active component as opposed to those on active duty.[2] Second, the survey shifted from a web-based anonymous survey to a web-based confidential survey. A confidential survey allowed the research team to make two important changes to survey procedures: reduction in unwanted contacts by focusing reminders only on nonresponders and reducing survey burden on respondents by linking their survey to administrative data.

Survey Approval

The final survey, the sampling plan, all communication with potential respondents (see Appendix B), and the data security plan were reviewed by RAND's Institutional Review Board (known as the Human Subjects Protection Committee), the Westat Institutional Review Board, the Coast Guard's Institutional Review Board, the Office of People Analytics (OPA), the Office of the Under Secretary of Defense for Personnel and Readiness's Research Regulatory Oversight Office, the Office of the Assistant Secretary of Defense for Health Affairs and the Defense Health Agency's Human Research Protection Office, and the DoD Security Office. All survey materials included the survey report control system license number: DD-HA(BE)2189 (expires February 28, 2023). See Appendix A for the final 2018 DoD HRBS.

Survey Administration

RAND partnered with Westat, which implemented the web-based survey as a subcontractor. The survey opened on October 22, 2018, and closed on March 1, 2019.

Population and Sample

The sampling frame of the 2018 HRBS included all reserve component personnel as of September 2018 who were not enrolled as cadets in service academies, senior military colleges, and other Reserve Officers' Training Corps programs. Personnel in an active National Guard or reserve program and full-time National Guard members and reservists are classified as members of their reserve component branch of service and are included as part of this sample. We used data provided by the Defense Manpower Data Center (DMDC) to construct the sampling frame. The total sampling frame was 811,576 reserve component service members.

The sampling frame utilized 70 strata based on the interaction of service component branch (seven categories), pay grade (five categories), and gender (two categories). Note that the seven service branches considered here include Air National Guard, Air Force Reserve, Army National Guard, Army Reserve, Coast Guard Reserve, Marine Corps Reserve, and Navy Reserve. By considering anticipated response rates that differ across these strata, the sampling plan attempted to minimize the survey design effect (i.e., loss of precision). The 2016 Workplace and Gender Relations Survey of Active Duty Members (WGRA) was used to provide the best indicator of response rates that could be expected across strata because it was a large, DoD-wide survey that had recently been conducted.

Women were sampled at approximately twice the rate of men. Service members from the Coast Guard and Marine Corps were sampled at approximately 1.5 times the baseline rate, whereas Air Force service members were sampled at approximately 0.75 times the baseline rate. Lastly, junior enlisted service members (pay grades E1–E4) were sampled at approximately

[2] Reserve component service members, once activated, serve on active duty. Active component service members are, by default, considered active duty. In this report, we compare active and reserve component service members, ignoring activated status.

1.15 times the baseline rate. The sampling rates were scaled so that exactly 150,004 service members were sampled in total. A holdback sample of 49,999 service members was also selected to help protect against lower-than-anticipated response rates. Ultimately, 198,320 reserve component service members were invited to participate in the 2018 HRBS.

Final Analytic Sample

The final analytic sample consisted of 16,475 surveys. A usable survey was defined as one in which the respondent provided at least one response to an alcohol-related item, as this was the first major substantive area addressed. This is similar to how a usable survey was defined for the 2015 HRBS. Among those who were included in the final analytic sample, the average completion time was 20.6 minutes (standard deviation = 10.8 minutes). The majority of the sample accessed the survey via a laptop or desktop computer (93.3 percent), with 5.5 percent using a mobile device and 1.1 percent using a tablet.

Response Rates

Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. In this case, *ineligible* refers to sample members who were deceased at the time of the survey (n = 11). This response rate calculation corresponds to American Association for Public Opinion Research Response Rate 1 (American Association for Public Opinion Research, 2016). We also present weighted response rates, using the design weights (weights are described in the next section). The overall unweighted response rate for the reserve component was 8.2 percent (9.4 percent weighted).[3] The response rate was highest among the Air Force Reserve, Air Force Air National Guard, and Coast Guard (all at 16.1 percent unweighted and 16.2, 16.6, and 15.6 weighted response rates, respectively) and lowest among the Marine Corps Reserve (3.2 percent unweighted, 3.4 percent weighted). Senior officers (O4–O7) were the most likely to respond (22.4 percent unweighted and 22.7 percent weighted), and junior enlisted personnel (E1–E4) were the least likely to respond (3.3 percent unweighted and 3.4 percent weighted).

Weights

As is common practice in analysis of survey data, we used statistical weighting to correct for underlying differences between respondents and nonrespondents and to therefore improve the ability of findings from the survey to generalize to the population of survey-eligible service members. Unlike the anonymous 2015 HRBS, the 2018 HRBS was confidential, which allowed us to link both respondents and nonrespondents to DMDC administrative files containing demographic information (e.g., service branch, age, education, race/ethnicity). This information was used to quantify the ways in which our respondents differed from the broader population of survey-eligible service members. We calculated analytic weights in two stages. First, we estimated design weights that counteracted the survey design, which slightly oversampled Marines, women, and junior enlisted personnel to guarantee enough of those groups to yield reliable estimates. Second, we calculated nonresponse weights, which were used to make the respondents representative of those who were selected for sampling. The final analytic weights were calculated as the product of the design and nonresponse weights

[3] The overall unweighted response rate for the 2018 HRBS, including both active and reserve components, was 8.4 percent, and the overall weighted response rate was 9.5 percent.

and were used to make the analytic sample representative of the eligible service member population. The generalizability of weighted HRBS findings to the population of survey-eligible service members is predicated on a handful of assumptions, primarily that that the likelihood of a sampled service member responding to the survey (and, with it, any meaningful differences between respondents and nonrespondents) is dependent only on characteristics that are observed for both respondents and nonrespondents (or, under further assumptions, characteristics for which population benchmarks exist).

Missing Data and Imputation

The bulk of missing data in the 2018 HRBS (approximately 94 percent) was due to dropout. Missingness rates in the data ranged from less than 0.1 percent for items appearing early in the survey to 7 percent for items that occurred later. A common approach for addressing missing data is imputation (Little and Rubin, 2019), wherein a predictive model is used to replace missing values with ones that are statistically plausible. Imputation results in a data set that is more representative of the inferential population and makes more-efficient use of the available data for all cases, even when not every survey item was completed. Furthermore, imputation can address bias when patterns of missingness are completely random or depend on observed data, but it does not prevent bias when patterns of missingness are dependent on unobserved data (Little and Rubin, 2019). Unlike prior HRBSs, missing data in the 2018 HRBS are imputed, creating a single imputed data set.

The imputed data set was created using mice in R (Van Buuren and Groothuis-Oudshoorn, 2011), which allows its user to specify the imputation method used for each variable (e.g., gaussian imputation, logistic imputation, polytomous imputation, predictive mean matching [PMM]), as well as the dependencies for each variable that is to be imputed. We used PMM (Little, 1988) to impute binary, ordinal, and continuous variables, whereas polytomous regression was used to impute categorical data. Logistic regression was not used as a manner of imputing binary data because it performed poorly for imputing variables with sparse distributions, which are common in HRBS data. Particular attention was paid to the complicated skip logic that underpins the HRBS survey instrument. Furthermore, a sequentially specified imputation model (in lieu of a fully specified one) was needed to prevent divergence across iterations of the Markov chain Monte Carlo (MCMC) procedure employed within mice. For final imputations, five iterations of MCMC were used, as this is recommended within existing literature (White, Royston, and Wood, 2011; Van Buuren, 2018). More details about the imputation procedure can be found in Appendix E.

Analysis Approach

Comparisons Across Military Subpopulations

All analyses used the analytic weights and imputations previously described. In most circumstances, differences in each outcome were tested across levels of key factors or by subgroups (service branch, pay grade, and gender) using a two-stage procedure.[4] First, we used the Rao-Scott chi-square test as a gateway test for whether there was any difference in the outcome across all levels of the factor. Second, if this test concluded that there was a statistically significant relationship between the outcome and the factor, then we attempted

[4] Results by race/ethnicity and age groups can be found in Appendix D.

to identify the levels of the factor in which the outcome differed by constructing all possible pairwise comparisons of the outcome across the levels of the factor.

In cases where one or more subgroups had a zero on a particular outcome, those subgroups were omitted from the computation of the Rao-Scott chi-square text and were not included in pairwise comparisons. In cases where estimates were suppressed, we omitted subgroups that had suppressed estimates in pairwise comparisons. Suppression of estimates occurred for one of two reasons. In the first case of suppression, both point estimates and confidence intervals (CIs) were suppressed when fewer than 15 service members were included in the denominator of any given cell—that is, when the eligible population was less than 15. In the second case of suppression, CIs, but not point estimates, are provided. This occurs when the half-width of a CI is 15 percent or greater (i.e., greater than the point estimate itself).

Comparisons with Healthy People 2020 Objectives

For roughly the past 30 years, the Office of Disease Prevention and Health Promotion has developed a set of evidence-based objectives aimed at improving the health of American citizens. Benchmarks are established for ten-year cycles, and the current set of goals is outlined in Healthy People 2020 (HP2020). Department of Defense Instruction (DoDI) 1010.10 states that it is DoD policy to "[s]upport the achievement of the Department of Health and Human Services' vision for improving the health of all Americans as outlined in Healthy People 2020." As such, where possible, this report will compare results from the 2018 HRBS with HP2020 objectives. However, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest.

Comparisons with the 2018 HRBS Active Component Sample

Because of the differences in demographic characteristics between active and reserve component members, direct comparison of the results for these two groups could be misleading. We attempted to minimize these differences by comparing the two groups using regression models in which we simultaneously controlled for many of the demographic differences across the two samples. For most outcomes, we controlled for the following characteristics: service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, Armed Forces Qualification Test percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade (to account for differences in the distribution of pay grade across the services and by component). Exceptions are noted in the text. To be clear, none of the comparisons between the active and reserve component populations presented in this report are based on simple comparisons of raw percentages between the two populations.

Limitations

The 2018 HRBS is not without limitations. First, as with any self-report survey, social desirability bias is always a possibility, especially when topics may be sensitive or unflattering to the respondent. Second, though higher than in 2015, the response rate for the 2018 is still considered low for survey research. Although low response rates do not automatically mean that survey data are biased, they do increase the probability of bias. Third, for some groups

that comprise a smaller percentage of the overall DoD population (e.g., warrant officers, non-Hispanic Asian service members), CIs of our estimates may be larger, indicating a lower level of precision in the estimate. Thus, these results should be interpreted with caution. And, fourth, direct comparisons between civilians and reserve component service members might not be appropriate, given demographic differences between the two populations.

Sample Demographics

Table S.1 presents the distribution of the weighted 2018 HRBS reserve component sample by the three characteristics used for sampling: service branch, pay grade, and gender. The second

Table S.1
Distribution of Service Branch, Pay Grade, and Gender in the 2018 HRBS Reserve Component Weighted Respondent Sample, with 2017 DoD Comparison

	2018 HRBS Weighted Respondent Sample with Coast Guard (%)	2017 DoD Reserve Component Population (%)
Service branch		
Air Force Reserve	8.5	8.4
Air National Guard	13.1	13.0
Army Reserve	23.8	23.8
Army National Guard	41.8	42.2
Marine Corps Reserve	4.8	4.7
Navy Reserve	7.3	7.1
Coast Guard Reserve	0.8	0.8
Pay grade		
E1–E4	42.0	42.1
E5–E6	30.5	30.5
E7–E9	10.9	11.2
W1–W5	1.5	1.5
O1–O3	7.6	7.5
O4–O6	7.3	7.0
Gender		
Men	79.6	80.4
Women	20.4	19.6

SOURCE: Information in the first column comes from the 2018 HRBS; the second column is from U.S. Department of Defense, Defense Manpower Data Center, Reserve Components Common Personnel Data System (September 2017), Alexandria, Va.: Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, 2018.

column in the table compares the weighted 2018 HRBS with the 2017 DoD reserve component population.[5]

Key Findings

Below we highlight key findings, organized by substantive area. This summary does not include CIs around point estimates, which can be found in the main chapters in the report itself.

Health Promotion and Disease Prevention

Within this domain, we examined weight status, physical activity, screen time, health insurance, annual physical assessments, and sleep. Key findings include the following:

- Over one-quarter (31.4 percent) of the reserve component was of normal weight, based on their body mass index (BMI), and one-fifth (19.0 percent) were classified as obese. The rate of obesity in the reserve component is still well below the rate in the general population (31.4 percent) and below the HP2020 goal (30.5 percent or less).
- Well over half of reserve component service members (67.2 percent) reported that they engaged in at least 150 minutes per week of moderate physical activity (MPA) or at least 75 minutes per week of vigorous physical activity (VPA), and almost half (41.6 percent) reported 300 or more minutes of MPA per week or more than 150 minutes of VPA per week. The reserve component exceeded the HP2020 goals for physical activity. Additionally, 43.1 percent of service members reported engaging in strength training at least three days per week. Overall, the reserve component also exceeded the HP2020 goal for strength training.
- Junior enlisted service members, who are also the youngest service members, were, on average, more likely to report engaging in five or more hours of screen time per day (31.5 percent) than older service members.
- Fewer than three-quarters (71.6 percent) of reserve component respondents reported having an annual physical exam, despite the requirement that every service member, including reservists, have one.
- Eight percent of reserve component service members reported having no health insurance of any kind.
- We found that less than half (45.4 percent) of reserve component service members reported getting the recommended seven or more hours of sleep per night, one-quarter rated their sleep as very bad or fairly bad, and nearly 20 percent of respondents reported being severely or moderately bothered by a lack of sleep. The reserve component does not meet the HP2020 goal for recommended hours of sleep (72.8 percent or more). Over one third reported frequent use of energy drinks to help them stay awake; however, fewer than 3 percent reported use of either over-the counter (OTC) or prescription medications to do so.

[5] We use fiscal year (FY) 2017 data for two reasons. First, this time period coincides with the timing of sample selection. Second, comparable FY 2018 data was not available at the time of the writing of this report.

Substance Use

Within this domain, we examined use of alcohol, tobacco and nicotine, marijuana and synthetic cannabis, other drugs, and prescription drugs. Key findings include the following:

- According to survey estimates, 29.0 percent of reserve component service members were current binge drinkers, and 7.4 percent were current heavy drinkers.
- Approximately 5 percent (4.8 percent) reported one or more serious consequences from drinking in the past year, with 6.1 percent reporting any risky drinking and driving behavior and 5.3 percent reporting work-related productivity loss from alcohol use.
- Approximately one-fifth (20.2 percent) of all reserve component service members agreed with at least one of the statements indicating that military culture is supportive of drinking.
- An estimated 30.5 percent of service members currently used tobacco in some form. This rate is higher than rates of current tobacco use in the general population (approximately 19.3 percent). Rates of e-cigarette use were also higher among reserve component service members (9.9 percent) than in the general population (4.6 percent; Centers for Disease Control and Prevention [CDC], 2017).
- Cigarettes were the most common type of tobacco used (13.3 percent), followed by smokeless tobacco (11.0 percent) and e-cigarettes (9.9 percent).
- Few reserve component service members reported use of any drugs in the past 12 months (2.7 percent). Less than one percent reported use of any nonprescription cough or cold medicine in the past year (0.4 percent) or drugs other than marijuana and synthetic cannabis (0.7 percent; these included cocaine [including crack], lysergic acid diethylamide [LSD], phencyclidine [PCP], 3,4-methylenedioxy-methamphetamine [MDMA, commonly called ecstasy], methamphetamine, heroin, and gamma hydroxybutyrate [GHB]). Roughly 3 percent reported use of marijuana or synthetic cannabis in the past 12 months. Use of illicit drugs in the past month was also low, with marijuana and synthetic cannabis as the most frequently used.
- Regarding prescription drugs, results suggest lower rates of past-year use of stimulants, sedatives, and pain relievers among service members compared with civilians. Prescription pain relievers were the most common prescription used by reserve component service members (8.3 percent).
- Among reserve component service members, 1.7 percent misused one or more types of prescription drugs in the past year. Rates of misuse were low in the absolute sense, but prescription pain relievers were misused most often (1.0 percent).

Mental and Emotional Health

Within this domain, we examined mental health indicators (i.e., serious psychological distress and posttraumatic stress disorder [PTSD]), social and emotional factors associated with mental health (i.e., angry and aggressive behaviors, unwanted sexual contact, physical abuse, problematic gambling), suicide (including suicidal ideation, suicide plans, and suicide attempts), mental health service utilization, perceived unmet mental health treatment need, barriers to utilizing mental health services, and concerns that mental health treatment would damage one's military career. Key findings include the following:

- Approximately 7 percent of reserve component service members reported serious psychological distress in the past 30 days, and 10.5 percent of service members evidenced probable PTSD. Prevalence of both serious psychological distress and probable PTSD in the reserve component was higher than rates observed among the general population (2.9 percent to 5.2 percent for serious psychological distress [Center for Behavioral Health Statistics and Quality, 2018]; 4 percent for PTSD [Kessler, Berglund, et al., 2004]).
- Nearly half (46.9 percent) of reserve component service members reported any angry or aggressive behavior in the past 30 days.
- Among all reserve component service members, 7.8 percent indicated experiencing any unwanted sexual contact since joining the military, with 1.6 percent of individuals responding that they had experienced unwanted sexual contact in the past year. Women were significantly more likely to indicate experiencing unwanted sexual contact than men. Among women, approximately 24.0 percent indicated that they had experienced unwanted sexual contact since joining the military, and 4.6 percent indicated experiencing unwanted sexual contact in the past 12 months. It is important to keep in mind that the WGRA, the Workplace and Gender Relations Survey of Reserve Component Members (WGRR), and the HRBS measure different constructs. The WGRA and WGRR measure *sexual assault*. The HRBS measures *unwanted sexual contact*, which is a broader construct. We defined *unwanted sexual contact* as "times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration." Thus, results are not comparable across the two surveys.
- Few reserve service members indicated experiencing a physical assault while in the military (3.8 percent) or in the past year (0.7 percent). By comparison, in the general population, approximately 1.7 percent of individuals ages 12 and older reported experiencing a physical assault in the past year (Morgan and Kena, 2018).
- In the 2018 HRBS reserve component, 6 percent of all service members endorsed having thoughts of suicide in the past 12 months, 2.0 percent reported suicide plans, and 0.9 percent reported a suicide attempt. Rates of suicide ideation, plans, and attempts are slightly higher than those observed among the general U.S. population: Among adults aged 18 or older in the general population, 4.3 percent endorsed thoughts of suicide, 1.3 percent endorsed suicide plans, and 0.6 percent reported a suicide attempt in the past year (Substance Abuse and Mental Health Services Administration, 2019b).
- The prevalence of problem gambling in the total reserve component sample was approximately 1.7 percent, which is lower than the prevalence of pathological gambling in the U.S civilian population (2.3 percent; Kessler, Hwang, et al., 2008).
- Overall, one-fifth (21.0 percent) of reserve component service members reported using any mental health services. This proportion is higher than in the general population, according to the National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2019b).
- Reserve component service members were about equally likely to receive mental health treatment from specialty mental health providers (13.5 percent) as from general medical providers (12.7 percent). This pattern differs from that observed in the general population, where most individuals who receive mental health care receive that care from general medical providers (Olfson et al., 2019).

- The percentage of reserve component service members who received mental health services at a civilian health facility (10.3 percent) was higher than that receiving mental health services at a military facility (5.7 percent) or a U.S. Department of Veterans Affairs (VA) facility (5.4 percent).
- Approximately 8 percent of reserve component service members reported using a medication for a mental health condition in the past year. Medication is the most commonly received form of mental health treatment in the general population, with about 12 percent of adults using a prescription medication for a mental health problem in the past year (Substance Abuse and Mental Health Services Administration, 2019b).
- The proportion of all reserve component service members reporting unmet need for mental health treatment in the past year was roughly 5 percent. Among those with an unmet need for treatment, the most commonly endorsed reason for not receiving care was thinking that treatment was not needed at the time. This is consistent with findings from the civilian literature suggesting that low perceived need for treatment is the most common reason that people with mental health problems do not seek care (Mojtabai, Olfson, and Mechanic, 2002).
- Almost one-third (29.9 percent) of reserve members perceived that seeking mental health treatment would damage a person's military career.

Physical Health and Functional Limitations

Within this domain, we examined chronic health conditions (e.g., hypertension, high cholesterol, diabetes, etc.), physical symptoms, pain, traumatic brain injury (TBI), mild traumatic brain injury (mTBI), postconcussive symptoms, and self-reported health. Key findings include the following:

- Overall, 36.6 percent of reserve component service members reported being told by a health care provider that they had at least one chronic condition. The most common conditions were bone, joint, or muscle injury and back pain. Rates of hypertension, high cholesterol, and diabetes were low relative to the general population.
- The most commonly reported physical symptoms included trouble sleeping and feeling tired or having low energy. Back pain and pain in the arms, legs, and joints were also common. Approximately 21.1 percent reported bodily pain, including headache. There was a disparity in rates of pain for enlisted versus officers, particularly at senior pay grades.
- An estimated 4.3 percent of service members screened positive for mTBI, and an estimated 2.7 percent reported postconcussive symptoms. Rates of moderate to severe TBI were low (0.2 percent).
- Over half (57.4 percent) of reserve component service members reported that their health was very good or excellent.
- On average, reserve component service members reported missing 0.53 days of work (i.e., absenteeism) and experiencing reduced productivity (i.e., presenteeism) on 1.50 days in the past 30 days.

Sexual Behavior and Health

Within this domain, we examined past-year sexual risk behaviors, sexually transmitted infections (STIs) and unintended pregnancies, use of and access to contraceptives, and human immunodeficiency virus (HIV) testing. Key findings include the following:

- Risky sexual behavior among reserve component members was not uncommon: 15.9 percent reported more than one sex partner in the past year, 33.2 percent did not use condoms with new sex partners, and 17.7 percent were at high risk for HIV infection at the time of the survey.
- A total of 1.9 percent of reserve component members reported a past-year STI. Rates of STIs were higher among women (4.0 percent) than men (1.3 percent).
- Among women, 3.2 percent reported an unintended pregnancy in the past year; for men the percentage was 2.3. Unintended pregnancy during deployment was extremely rare (0.02 percent).
- A total of 19.1 percent of reserve component members reported that they did not use any contraception at most-recent vaginal sex. At the same time, only 73.8 percent of women at risk for pregnancy used contraception at last sex, well short of the 91.6 percent HP2020 goal.
- Less-than-highly-effective contraceptive methods were used by roughly one-third of reserve component members and were the most commonly used methods overall.
- Most reserve component members did not receive any contraceptive counseling prior to deployment. Counseling rates were significantly lower for men (15.2 percent) than for women (33.4 percent). Most women who sought birth control before (82.3 percent) or during deployment (73.7 percent) were able to access the method they preferred. In contrast, most men who sought birth control before or during deployment were unable to get their preferred method (12.2 percent were able to access it before deployment and 14.0 percent during deployment).
- A total of 71.4 percent of reserve component members reported past-year HIV testing. Among men who have sex with men (MSM), reserve component members exceeded the HP2020 target for HIV testing (84.2 versus 68.4 percent). Still, a notable percentage of both MSM and those at high risk (more broadly defined), roughly one-fifth, were not tested during this recommended period.

Sexual Orientation and Health

Within this domain, we provided an estimate of the percentage of men and women serving in the reserve component who are lesbian, gay, or bisexual (LGB) and key information about the health-related behavior and health status of LGB service members. Key findings include the following:

- Overall, 2.8 percent of servicemen and 9.8 percent of servicewomen reported one or more same-sex partners in the prior year.
- Just over 6 percent (6.1 percent) of all reserve component service members identified as LGB. Significantly more women (15.4 percent) than men (3.8 percent) identified as LGB.
- LGB service members were less likely to be overweight or obese (54.6 versus 66.1 percent) but also less likely to have had a routine checkup in the past 12 months (67.0 percent versus 71.9 percent) and less likely to have had good or fairly good sleep quality in the past 30 days (68.8 percent versus 75.2 percent), compared with non-LGB members.
- Compared with their non-LGB counterparts, LGB service members were more likely to engage in binge drinking (37.5 versus 28.4 percent) and heavy drinking (12.0 versus 7.1 percent) and to smoke regular cigarettes (21.5 versus 12.8 percent). They were more than twice as likely to use e-cigarettes (19.2 versus 9.3 percent) and four times more likely

to use any illicit drug in the past 30 days (9.3 percent versus 2.3 percent) as non-LGB service members. Use of prescription pain relievers in the past year was also somewhat higher among LGB versus non-LGB members (11.0 percent versus 8.1 percent); however, LGB service members were less likely to use smokeless tobacco than other personnel (5.6 percent versus 11.3 percent).

- LGB service members also engaged in more risky sexual behavior and had more-negative sexual health outcomes on some measures. They were more likely to have had sex with a new partner without a condom in the past 12 months (39.4 versus 32.7 percent), more likely to have had more than one sex partner in the past 12 months (33.5 versus 14.7 percent), and more likely to have had an STI in the past 12 months (6.2 versus 1.6 percent) than their non-LGB peers. However, LGB personnel were more likely than non-LGB personnel to have had an HIV test in the past six months (45.5 versus 38.0 percent).
- LGB service members were more likely than their non-LGB peers to suffer from a host of mental and emotional health issues in the past year. These include serious psychological distress (23.7 versus 9.9 percent), probable PTSD (17.7 versus 10.0 percent), and angry and aggressive behavior (52.7 versus 46.5 percent). Rates of suicidal ideation (17.7 versus 5.2 percent) and suicide attempts (2.4 versus 0.8 percent) were about three times higher among LGB personnel than among non-LGB personnel. Use of mental health services by LGB service members was also higher, including care from mental health specialists (26.0 versus 12.7 percent) and general medical doctors (23.6 versus 11.9 percent). Use of medications for mental health issues in the past year was also more common among LGB service members (16.1 versus 7.7 percent). Finally, both perceived unmet need for treatment (10.8 versus 4.1 percent) and perceived career-related stigma (39.0 versus 29.3 percent) were greater among LGB service members.
- LGB service members were substantially more likely than their non-LGB peers to indicate having experienced unwanted sexual contact both since joining the military (22.7 versus 6.8 percent) and in the past year (7.2 versus 1.2 percent). LGB service members were also more likely than their non-LGB peers to indicate having been physically assaulted both since joining the military (7.2 versus 3.6 percent) and in the past year (1.8 versus 0.6 percent).

Deployment Experiences and Health

Within this domain, we examined the frequency and duration of deployments (including both combat and noncombat deployments), combat trauma exposure, and deployment experiences and health. Key findings include the following:

- Across all services, just over half of reserve component service members (52.9 percent) had been deployed at least once, either in a combat or noncombat environment. Similarly, just under half (47.1 percent) reported having never deployed.
- Roughly one-fifth (19.7 percent) of all service members who had ever deployed had never been on a combat deployment.
- Two-thirds (66.7 percent) of previously deployed reserve component personnel reported that they had not deployed in the past 12 months.
- Overall, roughly 40 percent (41.2 percent) of all reserve component service members had experienced at least one of the six types of combat traumas we measured. The most fre-

quently endorsed trauma was knowing someone who was killed in combat (25.2 percent), and the least endorsed item was being wounded (3.5 percent).

- We examined several categories of outcomes between service members who had and had not deployed in the past year.
  - Substance use: Recent deployers were significantly less likely to have used marijuana or synthetic cannabis in the past 30 days than nondeployers (1.5 versus 0.6 percent).
  - Mental and emotional health: Similarly, significantly *fewer* recent deployers met the criteria for past-year serious psychological distress (8.0 versus 11.3 percent), as well as past-30-day serious distress (4.7 versus 6.8 percent). However, the rate of probable PTSD was significantly higher among the recently deployed versus those who had not recently deployed (12.0 versus 10.1 percent). Significantly fewer recent deployers reported that their sleep quality was "very good" compared with those who had not deployed in the past 12 months (13.5 versus 16.3 percent).
  - Physical health: Significantly more recent deployers reported any bodily pain in the past 30 days (22.6 versus 17.7 percent), any bodily pain (including headaches) (24.7 versus 20.3 percent), and higher physical symptom severity (13.1 versus 10.5 percent). Finally, the rate of mTBI was significantly higher among recent deployers than among non–recent deployers (5.7 versus 4.0 percent).

Comparisons with Healthy People 2020

DoDI 1010.10 states that it is DoD policy to "[s]upport the achievement of the Department of Health and Human Services' vision for improving the health of all Americans as outlined in Healthy People 2020." As such, it is important to be able to compare results from the HRBS to HP2020 goals to see how well the military is doing compared with these goals. However, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest. That said, members of the reserve component, who generally spend more time outside of active-duty military service, might look more like their civilian peers. Table S.2 shows comparisons between HP2020 goals and findings from the 2018 HRBS. Green cells indicate where the reserve component is doing as well or better than the relevant HP2020 goal; red cells indicate where it is doing worse.

The reserve component is doing well with respect to several HP2020 goals: obesity, physical activity, strength training, high blood pressure, high cholesterol, and HIV testing among MSM. However, on several HP2020 topics, reserve component service members fall short of HP2020 goals. Binge drinking and tobacco use (including cigarettes, cigars, and smokeless tobacco) are both areas where the prevalences of service members' behaviors are much higher than the goals set by HP2020. Adequate amounts of sleep are another potential area of concern, as the percentage of reserve component service members who achieve this metric is below the HP2020 goal. Finally, contraceptive use and prevention of unintended pregnancy are also areas where the reserve component could improve.

Table S.2
Comparison of 2018 HRBS Reserve Component with HP2020 Goals for Select Outcomes

Topic	HP2020 Goal	2018 HRBS
Health promotion and disease prevention		
Obesity (ages 20+)	30.5% (or less)	19.0%
Normal weight (ages 20+)	(at least) 33.9%	31.4%
MPA at least 150 mins/week or VPA 75 mins/week	(at least) 47.9%	67.2%
MPA for more than 300 mins/week or VPA for at least 150 mins/week	(at least) 31.3%	41.6%
Muscle-strengthening activities on 3+ days/week[a]	(at least) 24.1%	43.1%
Sleep: 8 hours/24-hour period for those 18–21 years of age, 7 hours/24-hour period for those older than 21	(at least) 72.8%	45.4%
Substance use		
Binge drinking	24.2% (or less)	29.0%
Current cigarette smoking	12.0% (or less)	13.3%
Current cigar smoking	0.3% (or less)	8.0%
Current smokeless tobacco use	0.2% (or less)	11.0%
Physical health and functional limitations		
High blood pressure	26.9% (or less)	9.3%
High cholesterol	13.5% (or less)	6.8%
Sexual behavior and health		
Use of contraceptive at most-recent sex (ages 15–44)	91.6% (or higher)	73.8%[b]
Use of moderately/most-effective contraceptive (ages 20–44)	69.3% (or higher)	60.3%
Annual HIV testing among MSM	68.4% (or higher)	84.2%

NOTES: HP2020 goals can be found at Healthy People, 2020a–2020u. The 2018 HRBS data in this table come from the "Total" column in the relevant tables in Chapters Four through Eight.

[a] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated in this way. Instead, the HRBS value represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

[b] The HRBS estimate is for women ages 17 to 44 because women below that age are not eligible to join the military.

Comparisons with the 2018 HRBS Active Component Sample

Given demographic differences between the active and reserve components, making direct comparisons between the two is not necessarily advised. We employed a regression model approach that allowed us to compare between the two components. It is important to note that not all of the differences between the surveys can be accounted for by this method, though we were able to include a number of important military and demographic characteristics as covariates in our model (e.g., service branch, pay grade, age, marital status). Table S.3 summarizes the results of these comparison. Outcomes are grouped by substantive area, as

Table S.3
Significant Differences Between the Active and Reserve Components for Select Outcomes

Health Promotion and Disease Prevention	Substance Use	Mental and Emotional Health	Physical Health and Functioning	Sexual Behavior and Health
Obesity (HP2020 goal)	Binge drinking	Past-month and past-year serious psychological distress	Physician-diagnosed chronic conditions: high blood pressure, back pain, bone/joint/muscle injury (including arthritis)	2+ sex partners in past year
Normal weight (HP2020 goal)	Heavy drinking	Probable PTSD	Physician-diagnosed chronic conditions: diabetes, high cholesterol, asthma, angina or coronary heart disease, heart attack	New partner sex without condom use in past year
Medium activity level (HP2020 goal)	Any alcohol consequences	Any angry or aggressive behavior in past 30 days	No medical condition diagnosed in past year	Condom use during most-recent vaginal sex
High activity level (HP2020 goal)	Risky drinking and driving behavior	Unwanted sexual contact in past 12 months and since joining the military	Physical conditions: stomach/bowel problems, back pain, arm/leg/joint pain, headaches, chest pain or shortness of breath, tired/low energy	STI in past year
Strength training 3+ days per week	Any productivity loss due to drinking	Physically assaulted in past 12 months and since joining the military	Physical conditions: dizziness	No contraceptive use at most-recent sex
Less than one hour of screen time per day	Military culture supportive of drinking	Past-year gambling problem	Any bodily pain (including headache)	Used highly effective contraceptive at most-recent sex
Routine annual physical exam	Current cigarette smoker	Past-year suicidal thoughts, suicide plans, and suicide attempts	Any bodily pain (excluding headache)	Used moderately or most-effective birth control method at last sex (women 20–44 years old)
Hours of sleep (HP2020 goal)	Current e-cigarette use	Perceived unmet need for mental health services	High physical symptom severity	HIV test in past year
Very good and fairly good self-rated sleep quality	Current smokeless tobacco user	Past-year mental health care service utilization	Excellent and very good self-rated health	High risk for HIV
Moderate to severe lack of energy due to poor sleep	Any past-12-month and past-30-day drug use (including marijuana)	Total mental health visits in past year	Absenteeism	High risk for HIV tested in past year
Frequent use of medication to sleep (3+ times per week)	Any past-12-month and past-30-day drug use (excluding marijuana)	Use of medication for mental health problem in past year	Presenteeism	Unintended pregnancy in past year

Table S.3—continued

Health Promotion and Disease Prevention	Substance Use	Mental and Emotional Health	Physical Health and Functioning	Sexual Behavior and Health
Frequent use of other caffeinated beverages, OTC medications, and prescription medications to stay awake (3+ times per week)	Any prescription drug use (including stimulants, sedatives, and pain relievers)	Perceived career-related stigma associated with mental health care service utilization		Contraceptive counseling prior to deployment
	Any prescription drug misuse (including stimulants, sedatives, and pain relievers)			Able to get preferred birth control before and while deployed

NOTES: Green cells indicate that the reserve component did better than the active component on the outcome in question. Red indicates that the reserve component did worse on the outcome in question. Orange indicates no difference between the two components. Blue indicates an outcome where the reserve component prevalence rate was significantly smaller, but it is unclear whether this was a better outcome; these outcomes are primarily related to use of mental health care services.

they are in the main body of the report, and focus only on overall difference (i.e., across all service branches). Details about cross-survey differences by service branch, pay grade, and gender can be found in Chapters Four through Eight.

Rather than focus on actual numbers, Table S.3 uses a stoplight approach—green topics indicate where the reserve component did better than the active component, red where the reserve component did worse, and orange where there was no difference. Note that "better" could mean significantly higher or lower prevalence rates, depending on the outcome.[6] Finally, a few cells are shaded in blue. These are outcomes for which the prevalence rate in the reserve component was significantly smaller than in the active component; however, it is unclear whether this was better. The outcomes are primarily related to use of mental health care services (e.g., total number of mental health care visits).

Policy Implications and Recommendations

Force Readiness, Health and Well-Being

A central use of the HRBS is to assess the readiness of the force with respect to the health and health-related behavior of service members. Therefore, we provide observations to help DoD and the services identify immediate and future threats to the health-related readiness of the reserve component (consisting of the service-specific reserves and National Guard), and we outline applicable policy recommendations. We direct most recommendations to DoD and the services because these departments are responsible for the reserves and National Guard. We

[6] For example, significantly more reserve component service members meeting HP2020 goals for sleep would be a higher percentage than the active component and a green cell in the table, but a lower percentage on lack of energy due to poor sleep would also be a green cell in the table.

direct recommendations to the Coast Guard separately because they fall under the Department of Homeland Security.

Health Promotion and Disease Prevention

- Not all reserve component respondents reported having an annual physical exam, which could be problematic because medical exams are used to identify asymptomatic illnesses, provide early intervention, and encourage healthy behavior (Merenstein, Daumit, and Powe, 2006). In addition, they are required for a service member (reservist or active component) to deploy. **More attention by DoD, the services, and the Coast Guard is needed to address the low compliance rate with physical examinations.**
- Roughly 8 percent of reserve component service members reported having no health insurance of any kind. Health insurance is a complicated issue for reservists because not all qualify for the same types of insurance. Access to care through insurance has shown to result in better health outcomes and better preventive care (Schriver, 1999; Starfield, Shi, and Macinko, 2005; Freeman, Kadiyala, et al., 2008; Henry, 2014), both of which contribute to a healthy and ready fighting force. **DoD, the services, and the Coast Guard could designate a health care navigator to assist units with low health insurance compliance rates, which might increase the number of personnel who are insured through the public or private marketplace.**
- Nearly one-fifth of the reserve force is classified as obese, according to the CDC's BMI categories, yet BMI may not accurately reflect physical health and conditioning. DoD is currently reviewing DoDI 1308.3, which outlines how to assess physical fitness and body fat across the military (reservists included), and the individual branches of service have been reviewing and making changes to their own physical fitness tests. **As part of these revisions, DoD, the services, and the Coast Guard should consider whether BMI is an appropriate measure of weight for service members.**
- Less than half of reserve component service members reported getting the recommended seven or more hours of sleep per night, one-quarter rated their sleep as very bad or bad, and nearly one-fifth of respondents reported being severely or moderately bothered by a lack of sleep. Difficulty sleeping and fatigue are important concerns that may impact the readiness of service members. **DoD, the services, and the Coast Guard should base efforts to educate reserve component service members and leaders on healthy sleep requirements and successful models in analogous populations** (e.g., Hershner and O'Brien, 2018).

Substance Use

- Reserve component service members reported binge drinking in the past 30 days at a rate of 29 percent, and approximately 7 percent were categorized as heavy drinkers. Nearly 5 percent reported any serious consequences from drinking, with over 6 percent reporting drinking and driving behavior and over 5 percent reporting work-related productivity loss due to drinking. One-fifth of all reserve component service members reported that military culture was supportive of drinking. **DoD, the services, and the Coast Guard might wish to promote reserve component alcohol reduction and prevention programs that change cultural beliefs about alcohol use and promote self-care.** Media campaigns and brief interventions that focus on demonstrating to groups that

heavy alcohol use could be less normative than they perceive it to be within their group have been efficacious in changing drinking behavior among young adult civilians and among veterans (Lewis and Neighbors, 2006; McDevitt-Murphy et al., 2015; Pedersen et al., 2017; Yamin et al., 2019). Education for commanders emphasizing adverse organizational consequences (e.g., accidents, injuries, intimate partner violence, sexual harassment and assault) could help to shift military drinking culture. Furthermore, as service members see others receiving and benefiting from care, they could be inspired to pursue their own care. However, it will be important for the military to encourage voluntary self-referral and reduce perceived and actual penalties for doing so. The Army's revised policy, which allows for soldiers to voluntarily self-refer without being mandatorily enrolled in a substance abuse program, is one such example (see Army Directive 2019-12, Policy for Voluntary Alcohol-Related Behavioral Healthcare).

- Nearly one-third of service members reported using tobacco in some form, such as through use of combustible cigarettes, e-cigarettes, cigars, smokeless tobacco, pipes, or hookahs. **Reducing tobacco use in all forms should be a high priority for DoD, the services, and the Coast Guard given the long-term health consequences of use.**
- Use of drugs in the past 12 months was generally low among reserve component service members. However, approximately 3 percent reported use of any drugs, with marijuana or synthetic cannabis use reported as most prevalent. **Preventing any drug use, including marijuana and synthetic cannabis use, should be a priority for DoD, the services, and the Coast Guard given the potential for the immediate and long-term effects of drug use, as well as legal complications associated with use of drugs that are illicit at the federal level.**
- **Though the rate of prescription stimulant, sedative, and pain reliever use was low (in an absolute sense) with just over 1 percent of service members reporting misuse of any prescription drugs in the past 12 months, DoD, the services, and the Coast Guard should monitor prescription drug availability in the military given their potential for misuse.** Moreover, pain relievers were most commonly misused—this is an outcome that should continue to be monitored, especially given that pain-related conditions were among the more prevalent physical health concerns.

Mental and Emotional Health

- Symptoms of psychological distress were common among reserve service members. If untreated, these symptoms could persist and lead to significant functional impairments, which have major implications for service member well-being and force readiness. **DoD, the services, and the Coast Guard should continue their efforts to monitor, understand, and support mental health for reserve service members.**
- Although a large percentage of service members receive mental health treatment, the process of seeking care remains a barrier. Practical challenges associated with scheduling an appointment and taking time off from work duties were commonly endorsed reasons for not utilizing mental health services. **DoD, the services, and the Coast Guard should continue their efforts to mitigate challenges associated with scheduling and attending appointments for mental health treatment.** In addition, the belief that mental health treatment would harm one's military career is still widespread; despite efforts to reduce stigma associated with mental health treatment, this belief was reported by over

one-third of the sample. Improving availability of mental health care alone will not fully address these barriers to care. **Therefore, DoD, the services, and the Coast Guard should explore the potential for enhancing the role of peers and commanders as facilitators of treatment-seeking through mental health literacy training and dissemination of information about mental health resources.** These nonclinical facilitators of help-seeking may be important for the reserve components and the National Guard because care is most likely to be sought outside of the military health system (MHS).

- Although specialty mental health providers were the most commonly endorsed source of mental health treatment, nearly half of mental health services were delivered by nonspecialists. **DoD, the services, and the Coast Guard should pursue additional research to identify, improve, and evaluate the sources, quality, and outcomes of nonspecialty mental health services utilized by service members.**
- Reserve component service members use mental health services in different ways than the active component and the general population. **This distinctive pattern of care suggests that DoD, the services, and the Coast Guard should monitor access to and quality of mental health care in the reserve component.** In particular, understanding potential barriers to care among reserve component service members who are predominantly covered by private health insurance and dependent on the civilian health system for care should be a priority.
- Approximately 6 percent of all reserve component service members reported suicidal ideation in the past year. Although lower than rates observed among active component service members in the 2018 HRBS, suicide ideation among reserve members was more prevalent compared with the general population (4.3 percent; Substance Abuse and Mental Health Services Administration, 2018). Women and junior enlisted service members demonstrated the highest rates of past-year suicide ideation, similar to patterns observed among active component service members in the 2018 HRBS. Efforts to target prevention strategies to these high-risk groups could be beneficial. **Despite an already substantial investment in funding to understand and prevent suicide among service members, DoD, the services, and the Coast Guard should make additional efforts to determine whether different prevention strategies are needed for different subgroups of reserve service members (e.g., by level of risk, demographic or psychosocial characteristics, etc.).**

Physical Health and Functional Limitations

- Though more than half of reserve component service members reported that their health was very good or excellent, it is notable that midcareer and senior enlisted reservists reported poorer health than junior enlisted or officers. This likely reflects a combination of factors, including age but also the cumulative effect of military training exercises and the nature of military occupations held by enlisted service members. **DoD, the services, and the Coast Guard should consider policies to mitigate adverse effects of military service on health, as this can have downstream consequences for readiness of reserve component service members.**
- Pain was a commonly reported health condition by service members, with just over one-fifth reporting some bodily pain the past 30 days. Pain relievers were the most frequently

misused prescription drug in the survey (though the rate was roughly 1 percent). Thus, the potential for pain to lead to misuse and abuse of prescription drugs makes it a potential area of concern for readiness. **DoD, the services, and the Coast Guard should place policy and program emphasis on preventing pain (e.g., reducing musculoskeletal and overuse injuries, reducing training injuries), as well as promoting a variety of treatment approaches, including pharmacological and nonpharmacological options (e.g., medication, behavioral interventions [such as cognitive behavioral therapy], complementary and alternative medicine).**

Sexual Behavior and Health

- **DoD, the services, and the Coast Guard should consider ways to increase the proportion of personnel who receive predeployment contraceptive counseling.** The 2016 National Defense Authorization Act required DoD to "establish and disseminate clinical practice guidelines on standards of care" for contraceptive counseling and to provide comprehensive counseling (*National Defense Authorization Act for Fiscal Year 2016*, 2015). Although we cannot be certain why few services members report receiving counseling, it is possible that many service members and providers see the counseling as less relevant to their situations. Educational efforts should make clear to both MHS providers and service members that directives to provide contraceptive counseling are relevant for all personnel, including those who are not currently sexually active or do not intend to be during deployment, those who identify as LGB, and those who intend to have children in the near future.
- **DoD, the services, and the Coast Guard should consider expanding efforts to provide contraceptive counseling specifically to men.** Research is ongoing to develop effective contraceptive counseling strategies that target men. Such strategies include counseling men on condom use and how to support their partners in using other methods, such as intrauterine devices (IUDs), as well as providing counseling services to couples.
- **DoD, the services, and the Coast Guard should increase the consistent and effective use of contraception through improved education about contraceptives.** Under the new contraceptive guidelines adapted by DoD, IUDs and implants are to be considered first-line methods of contraception. However, providers and service members might need additional training and education about the benefits of the most-effective contraceptive methods, with the caveat that these methods may not be appropriate for all women.
- **To prevent STIs and unintended pregnancies, DoD, the services, and the Coast Guard should also ensure that condoms are easily available through TRICARE and available to reserve component members at no or reduced cost.** Evidence from school-based condom availability programs indicates that these programs result in increased use of condoms and decreased rates of STIs without promoting sexual activity or increasing numbers of sex partners (Algur et al., 2019; Scott-Sheldon et al., 2011). **DoD, the services, and the Coast Guard should also consider implementing regular testing for STIs, especially among women.** Women in the reserve component were significantly more likely to report a past-year STI than men, and there are links between untreated chlamydia and infertility among women (Haggerty et al., 2010; Hafner, 2015).
- **DoD, the services, and the Coast Guard could increase annual testing for HIV infection among those at high risk through better screening for risk as part of the**

Periodic Health Assessment (PHA). Although the current version of the PHA asks pertinent questions, it is not clear whether information on various contributors to risk is combined to detect those in the highest risk category, nor is it clear whether certain risks (e.g., MSM) or combinations of risks should consistently trigger more frequent (annual or biannual) testing for HIV infection.

Sexual Orientation and Health

- **Broadly targeted health promotion efforts by DoD, the services, and the Coast Guard should include LGB-specific considerations, as appropriate, recognizing that LGB individuals are part of the service.** Addressing LGB health disparities is unlikely to require the development of programs or policies targeted specifically to this group, with only a few exceptions.
- **DoD, the services, and the Coast Guard should address the unique mental health needs of LGB personnel.** Current and future campaigns to reduce stigma surrounding mental health and service utilization should include messaging and images relevant to LGB personnel (e.g., feeling isolated, lack of acceptance) and should be tested for acceptability and perceived effectiveness in this subgroup of service members prior to implementation.
- **DoD, the services, and Coast Guard could reduce sexual health disparities, including the high rates of STI and HIV risk behavior, through education of providers in the MHS.** It is unclear whether MHS providers are aware of the high percentage of LGB personnel identifying as bisexual—roughly half. Incorrect assumptions that bisexual service members are heterosexual, gay, or lesbian based on the sex of their current sexual partners may lead to incomplete or incorrect counseling regarding use of condoms and other contraceptives and testing for STIs.
- The percentages of LGB service members smoking traditional cigarettes and using e-cigarettes are of particular concern, with roughly one in five LGB service members engaging in these behaviors. **DoD, the services, and the Coast Guard could use targeted clinical screening and intervention to assist with smoking cessation among LGB reserve component members. This should be considered as part of standard care for those who report LGB identity during routine health care visits when activated or during required annual physical assessments.** Though provider access to reserve and Guard members in a clinical setting is limited given their more restricted use of the MHS, it is important to highlight the consequences of such negative health behaviors when contact with these individuals is made.

Future Iterations of the HRBS

The HRBS has a long history within DoD, and with that history has come many changes to both survey content and survey implementation. The 2018 HRBS represents the fourth consecutive iteration to rely solely on internet administration. Over that same period, response rates have also declined. Below we offer some recommendations for future iterations of the HRBS, focusing on ways to improve the efficiency and effectiveness of data collection.

Consider the use of survey incentives. The general consensus among those who study survey implementation is that there is a positive association between incentives and response rates (Singer and Ye, 2013). Whether such incentives could improve response rates, and, thus,

reduce the possible response bias, among reserve component service members is an open question. According to DoDI 3216.02, it is possible for a federal contractor to compensate service members, who are considered federal employees, for participation in a survey. The next iteration of the HRBS should explore the use of targeted incentives, especially prepaid incentives that are not dependent on survey completion, to increase participation among certain groups with traditionally low response rates (e.g., junior enlisted personnel).

Shorten the survey and focus survey content. Though the 2018 HRBS was somewhat shorter than the 2015 version (measured in terms of time to completion), it is still a lengthy survey that can become tedious for respondents, especially if they have recently answered similar survey items in other service-specific or DoD-wide surveys. Survey fatigue is a continuing problem among service members, especially when it comes to health and health-behavior topics. Service members are required to complete the annual PHA (DD Form 3024; DoDI 6200.06). Some, though not all, of the content in the survey portion of the PHA overlaps with topics covered in the HRBS (e.g., chronic conditions, mental health, alcohol use). DoD should consider whether this duplication is necessary. On the one hand, overlapping surveys may be driving down response rates on the HRBS. On the other hand, the PHA is not anonymous or confidential; responses are directly tied to service members' medical records to develop treatment and care plans and could incentivize service members not to be entirely truthful if they feel that their responses could potentially result in negative career-related consequences. As a first step, DoD should explore whether and how responses to the similar items differ across the PHA and the HRBS.

An alternative approach to reducing survey content could involve the use of modules. Modules would be based on content—for example, a tobacco use module or a pain and musculoskeletal injury module. In this approach, not every service member would receive every set of items on the survey; instead, service members could be randomly (or purposively) assigned to receive a certain number or type of modules. Modules that address high-frequency topics might not need as many respondents as modules related to topics that occur with a much lower prevalence (e.g., drug use). And the same set of modules might not need to be asked at every iteration of the HRBS, especially if trend data suggest little change over time.

Explore the use of a service member panel for tracking risky behaviors over time. Finally, as a supplement to the HRBS, DoD should consider the use of a service member panel to gather information about certain health outcomes and health-related behaviors on a real-time basis. Panels are groups of individuals who agree to participate in a series of surveys for a period of time (e.g., six months, a year) and are replenished at regular intervals. Panels do require constant maintenance to make sure they remain representative of some underlying population of interest and generally are not efficient when it comes to assessing the population prevalence of rare outcomes. However, the use of a panel could be beneficial in terms of reducing the overall scope of the HRBS, which might positively impact response rates. Furthermore, a panel could be an attractive option because surveys cover a variety of topics that may impact readiness.

Conclusion

The HRBS is used by DoD, the Coast Guard, and the reserve components to assess the current health and well-being of the force and to identify possible threats to readiness. This report provides an overview of health outcomes and health-related behaviors across seven domains. The future of this study may face challenges—declining response rates, overlapping content with other surveys, and competition for resources—but it remains an important source of data for tracking trends, informing policy, and making programmatic decisions.

Acknowledgments

The research team would like to thank several individuals who helped make this research possible. At Westat, we would like to thank Wayne Hintze, Michael Hornbostel, and April Fales. Craig Bond, Kristie Gore, Lisa Harrington, John Winkler, and James Powers at RAND all provided management oversight and internal quality control. We also would like thank Donna White, Lee Remi, and Saci Detamore for their administrative assistance. Andrew Morral and Peter Glick provided input on early drafts of the survey questionnaire, and Matthew Cefalu and Bonnie Ghosh-Dastidar reviewed the imputation methodology. We thank our formal peer reviewers, Paul Bliese, Kimberly Hepner, and Beth Ann Griffin. Their comments and suggestions made the report stronger.

We are grateful to our program officer, Diana Jeffery (Defense Health Agency), and senior advisers Donald Shell (Office of the Assistant Secretary of Defense for Health Affairs, Health Services Policy and Oversight) and Mark Mattiko (U.S. Coast Guard) for their help. Without them, this effort would not have been possible.

We thank the service liaison officers who helped us coordinate with the services:[7] COL Pamela Delancy, COL Regina Powell, and CPT Tricia D. Kile from the Office of the Chief of the Army Reserve (OCAR); Franklin Childress and COL Mike Stewart from OCAR Army Reserve Communications; MAJ Frank L. Analla, Jr., MAJ Brooke Heintz, and Bridget B. Washington of the Army National Guard (ARNG); MSG Andrew J. Popham, ARNG Substance Abuse Program; Laura Mitvalsky from Army Medical Command; COL Kris Dixon, U.S. Army Reserve Command Public Affairs; Col. Thomas Moore, Air Force Medical Support Agency; Paul Baldwin, Air Force Public Affairs; LtCol Denise A. Kerr, Headquarters U.S. Air Force Public Affairs; Col Maureen A. Allen, U.S. Air Force (USAF) District of Washington; Col Timothy Stevens, USAF Medical Forces Advisor; Col Seferino S. Silva, Jr., Air Force Reserve Command Headquarters (AFRC HQ); Heather Thanepohn, AFRC HQ; Jim Simpson, Readiness & Transition, Office of the Assistant Secretary of the Navy, Manpower and Reserve Affairs; LTJG Stuart Phillips, Public Affairs Action Officer, Chief of Naval Personnel; CDR Rudy Herrera, CAPT Dan Seidensticker, and CAPT Richard Gist of the Navy Reserve; CDR Doug Gabos, Force Public Affairs Officer, Commander, Navy Reserve Force, Commander, Naval Air Force Reserve; Col Jason Julian, LtCol Jaret Rhinehart, LtCol Kevin L. Digman, and Jim Gallisdorfer of the Marine and Family Division; and Maj Craig Thomas, Public Affairs Officer for the Deputy Commandant of the Manpower and Reserve Affairs, U.S. Marine Corps.

Finally, we thank the many service members who volunteered their time to participate in the 2018 HRBS.

[7] Office affiliations and ranks were current as of the writing of this report.

Abbreviations

AFQT	Armed Forces Qualification Test
AFRC HQ	Air Force Reserve Command Headquarters
ARNG	Army National Guard
ARR	adjusted risk ratio
BMI	body mass index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CHAMPVA	Civilian Health and Medical Program of the Department of Veterans Affairs
CI	confidence interval
DMDC	Defense Manpower Data Center
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
FAQ	frequently asked question
FCS	fully conditional specification
FY	fiscal year
GAD-7	Generalized Anxiety Disorder 7-Item Scale
GBM	Generalized Boosted Models
GHB	gamma hydroxybutyrate
GLMER	generalized linear mixed effects regression
HHS	U.S. Department of Health and Human Services
HIV	human immunodeficiency virus
HRBS	Health Related Behaviors Survey

HP2020	Healthy People 2020
ID	identification
IDP	imminent danger pay
IUD	intrauterine device
K6	Kessler 6 Mental Health Scale
kg	kilograms
LGB	lesbian, gay, or bisexual
LSD	lysergic acid diethylamide
m^2	meters squared
MCMC	Markov chain Monte Carlo
MDMA	3,4-methylenedioxy-methamphetamine
MHS	military health system
MPA	moderate physical activity
MSM	men who have sex with men
mTBI	mild traumatic brain injury
NA	not applicable
NCO	noncommissioned officer
NDAA	National Defense Authorization Act
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NR	not reportable
NSDUH	National Survey on Drug Use and Health
NSFG	National Survey of Family Growth
OCAR	Office of the Chief of the Army Reserve
OTC	over-the-counter
PC-PTSD-5	Primary Care PTSD Screen for DSM-5
PCL-C	PTSD Checklist–Civilian
PCP	phencyclidine
PDHA	Postdeployment Health Assessment

PDHRA	Postdeployment Health Reassessment
PHA	Periodic Health Assessment
PHQ-9	Patient Health Questionnaire-9
PHQ-15	Patient Health Questionnaire-15
PMM	predictive mean matching
PTSD	posttraumatic stress disorder
RR	risk ratio
STI	sexually transmitted infection
TBI	traumatic brain injury
TFF	Total Force Fitness
TWANG	Toolkit for Weighting and Analysis of Nonequivalent Groups
USAF	U.S. Air Force
VA	U.S. Department of Veterans Affairs
VPA	vigorous physical activity
WGRA	Workplace and Gender Relations Survey of Active Duty Members
WGRR	Workplace and Gender Relations Survey of Reserve Component Members

CHAPTER ONE

Introduction

For more than 30 years, the U.S. Department of Defense (DoD) has relied on the Health Related Behavior Survey (HRBS) for self-reported data on the health and well-being of service members. The earliest iterations of the survey sought to better understand substance use (i.e., illicit drugs, alcohol, and tobacco) by service members.[1] In more-recent versions, the survey has expanded to cover other topics related to the readiness[2] of the force: mental, emotional, and physical health; risky sexual behavior; and the health of service members who have recently experienced a deployment. Additional content is updated periodically to address issues impacting service members at the time.

Using a stratified random survey approach, the HRBS collects data from active and reserve component members of the four DoD services—the Air Force, Army, Marine Corps, and Navy—as well as the Department of Homeland Security's Coast Guard. Title 14 of the United States Code refers to these five entities collectively as the armed forces. Traditionally, the survey has been completely anonymous; however, in 2018 the HRBS was administered as a confidential web-based survey. The reasons for this change in approach will be discussed later in the report.

The HRBS is intended to supplement, not replace, data from other sources, including administrative and patient health records, the Periodic Health Assessment (PHA), the Postdeployment Health Assessment (PDHA), and the Postdeployment Health Reassessment (PDHRA). Problems and issues that do not reach a clinical threshold are sometimes masked in official data, and various incentives could influence how service members respond to official queries about their health and health behaviors. Ultimately, triangulation of all these different data sources will help DoD and the Coast Guard better understand the ways in which the health, health-related behaviors, and well-being of service members might impact force readiness. For this reason, the HRBS has historically been used to make policy and programming decisions across DoD and the Coast Guard.[3] Furthermore, data from the HRBS is used by researchers to advance the field of military medicine.

This report provides more detail about the design, implementation, and results of the 2018 HRBS. It is the second in a series of reports:

---

[1] The current HRBS is authorized in DoD Instructions 1010.4 and 1010.01, both of which reference substance use.

[2] We use the DoD definition of *readiness*: "The ability of military forces to fight and meet the demands of assigned Missions" (see Joint Publication 1, 2020, and DoD, 2020).

[3] It should be noted that the HRBS is not designed to *evaluate* any specific program or set of programs.

- Report 1 (Meadows et al., 2021) focuses on the health, health-related behaviors, and well-being of service members in the active component.
- Report 2, this report, focuses on the health, health-related behaviors, and well-being of service members in the reserve component, including the National Guard and Air National Guard.[4]

In addition to these reports, the project also produced a series of research briefs and infographics that explore specific topic areas (e.g., mental and emotional health, substance use) and service branch–specific results.[5]

Context for the 2018 Health Related Behaviors Survey

One of the three lines of effort outlined in the 2018 National Defense Strategy is developing a more-ready, lethal force (DoD, 2018). The strategy goes on to state, "A more lethal, resilient, and rapidly innovating Joint Force, combined with a robust constellation of allies and partners, will sustain American influence and ensure favorable balances of power that safeguard the free and open international order" (p. 3). Such a ready, lethal force will result in a competitive advantage against current and future threats. Though readiness and lethality depend on a number of factors—training, equipment, technology, force structure—the health and well-being of service members is in some ways a fundamental enabler.

Total Force Fitness (TFF) is a useful framework for thinking about how data from the HRBS can help DoD create and maintain a ready, lethal force. In 2010, with assistance from the Consortium for Health and Military Performance at the Uniformed Services University of the Health Sciences, former Chairman of the Joint Chiefs of Staff ADM Michael Mullen outlined the TFF concept in a special issue of the journal *Military Medicine*. He noted, "A total force that has achieved total fitness is healthy, ready, and resilient; capable of meeting challenges and surviving threats" (Mullen, 2010, p. 1). The framework incorporates both mind and body in the eight domains outlined in Figure 1.1. Factors within each domain contribute to a service member's ability to meet the demands of military life. In other words, these factors set the stage for readiness (and resilience). By monitoring aggregate levels of key factors, the armed forces can assess how prepared they are to accomplish their missions.

The 2018 HRBS contains factors across all the eight TFF domains. The list below is not comprehensive but does highlight some of the key factors captured in each domain:

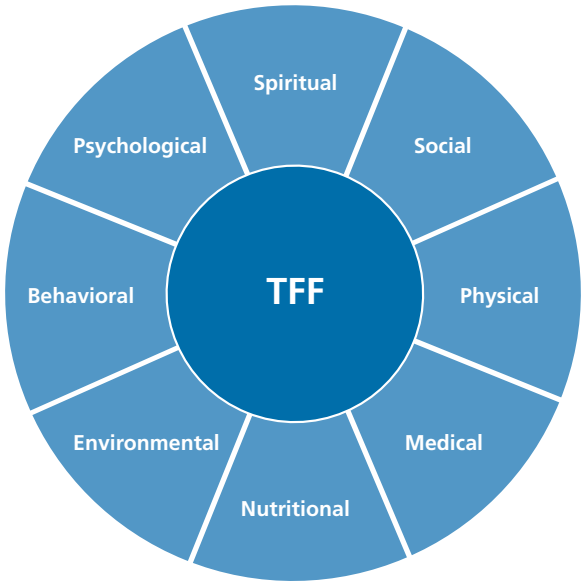
- Psychological: psychological distress, posttraumatic stress disorder (PTSD), suicide and suicidal ideation
- Spiritual: spirituality
- Social: marital status
- Physical: exercise, limitations
- Medical: chronic conditions, medication use

---

[4] In this report, the *reserve component* refers to members of the Selected Reserve in the Air Force Reserve, Army Reserve, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve, as well as members of the Air National Guard and Army National Guard.

[5] These materials can be found on the project webpage: www.rand.org/nsrd/projects/hrbs.

Figure 1.1
Eight Domains of Total Force Fitness



SOURCE: Meadows et al., 2018.

- Nutritional: caffeine use, supplement use
- Environmental: deployment experiences
- Behavioral: alcohol use, tobacco use, substance use, sexual behavior, sleep.

Survey History and Background

The 2018 HRBS represents the 14th iteration of the survey, with the most recent versions in 2015 (active duty only), 2014 (active duty and reserve), 2011 (active duty only), and 2009 (reserve component only). Administration occurs roughly every three to four years, and all surveys implemented since 2011 have been web-based. Earlier iterations were completed via paper and pencil in a group setting at military installations across the world. Other methodological improvements have occurred over time: changes in sampling strategy (from a geographic-based cluster approach to a population-based stratified random approach), increasingly sophisticated weighting and analysis approaches (e.g., imputation of missing data), and, as we describe in this report, a shift from an anonymous to a confidential survey. Similarly, survey content has changed over time, reflecting shifts in the types of behaviors (both positive and negative) in which service members engage. The most recent versions of the survey also strive to use existing, validated measures to compare findings with the U.S. civilian population. For example, one key civilian comparison is the Healthy People 2020 (HP2020) objectives established by the U.S. Department of Health and Human Services (HHS) Office of Disease Prevention and Health Promotion.[6] One important consequence of these survey changes is that some comparisons over time and across surveys are not advisable.

[6] For more information on the HP2020 objectives, see Healthy People, 2020r.

Updates to the 2018 HRBS

Several important changes were made between the most recent HRBS, fielded in late 2015 through early 2016, and the 2018 HRBS. First, because the 2018 survey was fielded among both the active and reserve components, the 2018 HRBS focused on service members in the active component as opposed to those on active duty.[7]

Second, the survey shifted from a web-based anonymous survey to a web-based confidential survey. Prior experience with the 2015 HRBS led the research team to advocate for this change (see Meadows et al., 2018). A confidential survey allowed the research team to make two important changes to survey procedures: reduction in unwanted contacts by focusing reminders only to nonresponders and reducing survey burden on respondents by linking their survey to administrative data. These changes will be explored further in Chapter Two.

Third, the research team reviewed all survey content from the 2015 HRBS and, in consultation with the sponsor and other key stakeholders, made updates to the survey content. For example, two recent National Defense Authorization Acts (NDAAs) required DoD to report on specific topics (e.g., reproductive health and gambling), which were added to the 2018 HRBS. These areas will be further explored later in the report. In contrast, some topic areas were removed from the survey. As noted above, because respondents were linked to administrative data, the survey did not ask about many sociodemographic and military factors (e.g., age, race/ethnicity, service branch, pay grade). Similarly, other topics were removed from the survey because they were determined to be unnecessary in every survey iteration (e.g., use of complementary and alternative medicine, texting while driving) or were no longer relevant (e.g., age at first alcohol use).

Finally, the team reviewed the content of the 2105 HRBS and identified areas where survey items could be revised or updated. In some cases, this meant dropping items that were redundant with others on the survey (e.g., the Alcohol Use Disorders Identification Test for Consumption, which assesses hazardous drinking). In other instances, this meant wholescale changes in measures (e.g., using the Kessler 6 Mental Health Scale [K6] to assess psychological distress instead of the Patient Health Questionnaire-9 [PHQ-9] to assess probable depression and the Generalized Anxiety Disorder 7-Item Scale [GAD-7] to assess probable generalized anxiety). And, in some cases, edits were made to improve the readability and clarity of survey items or to reduce survey burden on respondents (e.g., collapsing response options).

Comparison with the 2018 HRBS Active Component Sample

This report offers a comparison between the active and reserve components. The exact process used in the comparison is described in more detail in Chapter Two, but it is important to keep in mind that the two populations are different demographically. For example, active and reserve component service members differ with respect to age (the reserve component is older, on average), marital status (more reserve component service members are married), and geographic location (more reserve component service members live in the continental United States [DoD, 2017a; DoD, 2017b; and DoD, 2017c]). Furthermore, the military experiences

[7] Reserve component service members, once activated, serve on active duty. Active component service members are, by default, considered active duty. In this report, we compare active and reserve component service members, ignoring activated status.

of active and reserve component service members can be very different, and, depending on their status, they might not be eligible for the same benefits as their active component peers (Kapp and Torreon, 2018). These differences could also be associated with health and health behaviors. Thus, the comparisons presented here control for as many of these demographic and military characteristics as possible.

Organization of the Report

Chapter Two briefly summarizes the methodology of the survey, including the sampling design, questionnaire development, survey administration, imputation of missing data, weights, and the general analytic plan. Chapter Three provides a summary of the weighted final sample in terms of sociodemographic and military characteristics. The remaining chapters each focus on a key substantive issue addressed in the survey, as follows:

- Chapter Four: Health Promotion and Disease Prevention
- Chapter Five: Substance Use
- Chapter Six: Mental and Emotional Health
- Chapter Seven: Physical Health and Functional Limitations
- Chapter Eight: Sexual Behavior and Health
- Chapter Nine: Sexual Orientation and Health
- Chapter Ten: Deployment Experiences and Health.

The results of these substantive chapters may help DoD, the services, and the Coast Guard identify existing and emerging health problems among service members, develop programs and policies that target negative health behaviors, and, ultimately, maintain a ready force.

Finally, Chapter Eleven provides a brief, high-level summary of the results and outlines policy implications for DoD, the services, the Coast Guard, and the Defense Health Agency to consider. Policy recommendations are offered in two domains: (1) improving the health, health behaviors, and well-being of service members and (2) future implementation of the HRBS.

The report also contains five appendixes. Appendix A reproduces the web-based 2018 DoD HRBS. Appendix B contains the letters of support provided by Health Affairs and each of the service branches. Appendix C contains a description of key measures (organized by each substantive chapter), including how values were recoded, transformed, or combined for analysis and reporting. It also includes information on how we calculated scales and composite measures. Appendix D contains additional results that are not discussed in the main substantive chapters but might be of interest to some readers. Specifically, the tables in this appendix provide key outcomes broken down by age and racial/ethnic groups. Appendix E provides more detail about missing data and the imputation approach used in the study.

Finally, readers should always keep in mind that the survey results in this report can offer only statistical estimates of true population characteristics. Given the scope of the HRBS and the amount of material presented in this report, we often opt for less-precise terminology in the interest of readability. For example, though each table represents estimates rather than known values for the population of interest, we do not label each table or figure title as an estimate of a specific outcome, even though this phrase is implicit in all of the results presented.

CHAPTER TWO

Methodology

This chapter reviews the methodology used to conduct the 2018 HRBS. At the onset of the study, the research team reviewed prior HRBSs, with a focus on updating the 2011 and 2015 HRBSs of active-duty military personnel. As noted in Chapter One, we removed some existing content areas while adding others to measure emerging areas of concern. The remainder of this chapter provides a detailed description of the process used to review and revise survey content, the administration of the survey, the population and sampling plan, imputation of missing data, creation of survey weights, the analytic plan for the final data set, and, finally, limitations of the approach described here.

Survey Development

Though largely similar to the 2015 HRBS, the 2018 HRBS benefited from further refinement to reduce respondent burden, remove items that were not used in analysis of the data, and utilize existing, validated measure that facilitated comparisons with civilian populations. However, these changes mean that some comparison of items over time and across HRBSs might not be appropriate. Our ultimate goal was to create a survey that met the wide-ranging needs of a large group of key stakeholders but that did not duplicate already-existing data and did not place a heavy burden on service members who completed it.

Advisory Group

At the outset of the study, the sponsor organized a group of roughly 20 key stakeholders and subject-matter experts to serve on the 2018 HRBS Advisory Group. These individuals were asked to provide feedback on survey content, methods, and analysis throughout the study. Individuals in the group represented each of the DoD services, as well as the Coast Guard. In addition, the following DoD offices were represented: the Reserve Medical Programs office (of the Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs), the Defense Health Agency (specifically, the Women's Health, Medical Ethics, and Patient Advocacy division; Clinical Support division; and Communications division), the Drug Testing and Program Policy office (of the Office of the Under Secretary of Defense for Personnel and Readiness), the Sexual Assault Prevention and Response Office, the Defense Suicide Prevention Office, Walter Reed National Military Medical Center, and Uniformed Services University.

Cognitive Pretesting

An early version of the survey was pretested with a group of Air Force and Army military fellows who spent fiscal year (FY) 2018 at RAND. These fellows were all at the rank of major or lieutenant colonel and included both men and women. Feedback was provided in writing and during an hourlong focus group led by one of the research team leads. Fellows offered changes in wording and advice about topics to include and exclude.

Once the final survey instrument was programmed by Westat but was not yet live and available to respondents, a group of Pardee RAND Graduate School students tested the web survey, each portraying a persona (e.g., female, junior enlisted, with PTSD) designed to verify that skip patterns were working properly. These students also provided feedback on the general clarity of the survey.

Approval Process

The final survey, the sampling plan, all communication with potential respondents, and the data security plan were reviewed by RAND's Institutional Review Board (known as the Human Subjects Protection Committee), the Westat Institutional Review Board, the Coast Guard's Institutional Review Board, the Office of People Analytics (OPA), the Office of the Under Secretary of Defense for Personnel and Readiness's Research Regulatory Oversight Office, the Office of the Assistant Secretary of Defense for Health Affairs and the Defense Health Agency's Human Research Protection Office, and the DoD Security Office. All survey materials included the survey report control symbol license number: DD-HA(BE)2189 (expires February 28, 2023). See Appendix A for the final 2018 DoD HRBS.

Survey Administration

This section reviews the procedures used to administer the 2018 HRBS. RAND partnered with Westat, which implemented the web-based survey as a subcontractor. The survey opened on October 22, 2018, and closed on March 1, 2019.

Service Liaison Officers

Each of the services and components, including the Coast Guard, identified a senior officer and/or civilian to perform the duties of a service liaison officer (SLO). The SLO's primary function was to facilitate activities related to data collection, to include the following:

- obtaining a letter of support from a senior leader (i.e., a flag office or civilian member of the Senior Executive Service) within their component or branch, which would then be shared with potential respondents
- helping to identify procedures for whitelisting (or, in some cases, removing from a blacklist) the survey website address
- developing and distributing a marketing campaign for the survey (e.g., flyers, social media posts, and press releases).

Sample Contact

The initial contact with sample members included a mailed invitation from RAND and Westat, a letter from the (then-acting) Assistant Deputy Secretary of Defense for Health Affairs (see

Appendix B), and a set of frequently asked questions (FAQs; see Appendix A). All sample members with a valid DoD email address also received an introductory email. After that initial contact, service members who had not completed the survey or who had not requested to be opted out of future communication received reminders via email and postal letter. Service members who had a valid email address received up to six email reminders; service members with a valid mailing address received three letter reminders. Reminders were sent roughly weekly for ten weeks (excluding holiday weeks) with a single reminder (i.e., email *or* letter) sent weekly, with the exception of week 10, in which both an email and letter were sent. The final email and letter reminded potential respondents of the final day to complete the survey. The Defense Manpower Data Center (DMDC) provided all contact information (e.g., email and mailing addresses).

Survey Support and Help Desk

Service members who experienced technical difficulties could contact Westat via a 1-800 number or dedicated email address. Additional help information was provided via a Help button programmed on each survey screen. The Westat helpdesk was staffed from 8 a.m. to 5 p.m. (Eastern time) Monday through Friday, with voicemail and email available 24 hours a day. The majority of helpdesk contacts were related to opting out of future reminders or refusals.

A list of FAQs and answers was also available to potential respondents on the 2018 HRBS website (see Appendix A). The document contained an email address to which to direct questions about the overall study, as well as contact information for RAND's Human Subjects Protection Committee in case respondents had questions about their rights as participants.

Ensuring Confidentiality

Unlike prior HRBSs, the 2018 version was confidential rather than anonymous. Several steps were taken to ensure that participant data remained confidential. All confidentiality procedures were outlined in the survey consent and start screens. First, only RAND and Westat had access to information that could potentially identify respondents (e.g., email addresses). Second, a scrambled identification (ID) number linked respondent contact information to survey data, and only a select group of researchers at RAND and Westat had access to the linkage file. Third, any transfer of data—either contact data or survey data—used a secure encryption program. Fourth, both RAND and Westat had physical security procedures in place to protect confidential information and survey data (e.g., locked file cabinets, use of a cold room). Finally, data are reported only in the aggregate. That is, individual service member data are not reported in this final report nor will they be provided to anyone in DoD. To ensure that individuals cannot be identified by inference, this report presents estimates only if they are based on more than 15 possible individuals eligible to experience the outcome in question.[1]

One final step taken to protect the privacy of respondents was receipt of a Certificate of Confidentiality (CoC) from the National Institutes of Health. A CoC provides researchers with the right to legally refuse to disclose information that could identify specific respondents in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings (e.g., court subpoena).

---

[1] Note that results may be reported for estimates based on fewer than 15 *actual* cases. *Possible cases* refers to the exposed population, or those who are eligible to experience the outcome in question.

Population and Sample

Population

The sampling frame of the 2018 HRBS included reserve component personnel in the Selected Reserve and in the Air National Guard and the Army National Guard as of September 2018. Members enrolled as cadets in service academies, senior military colleges, and other Reserve Officers' Training Corps programs were ineligible. Personnel in the active component were classified as members of their branch of service and are included as part of a separate sample.[2] Reserve component members who were on active duty at the time of the survey are included in this reserve component report. We used data provided by the DMDC to construct the sampling frame. The total sampling frame was 811,576 reserve component service members.

Sampling Design

The eligible population was segmented into 70 strata based on the interaction of service component branch (seven categories), pay grade (five categories), and gender (two categories). Note that the seven service branches considered here are the Air National Guard, Air Force Reserve, Army National Guard, Army Reserve, Coast Guard Reserve, Marine Corps Reserve, and Navy Reserve. Domains were then defined as strata that embodied a single category of one of the characteristics used for stratification (e.g., all women, all Marines, all E1–E4). The 2018 HRBS reserve component sample was selected so as to enable analyses across each of these domains and, in certain cases, interactions of two of the domains. In particular, it was determined that an effective sample size (which accounts for loss of precision due to weighting) of at least 2,500 was needed in each domain and of at least 1,000 was needed within composite strata defined by interactions of gender (and/or junior enlisted pay grades) and service branches. These thresholds were needed to facilitate adequately precise analyses of dichotomous variables with sparse distributions, such as illicit drug use.[3] Furthermore, these thresholds were large enough to hedge against response rates that were lower than anticipated. As described below, because our sample design accounted for anticipated rates of nonresponse, these thresholds should have been large enough to hedge against nonresponse rates that were higher than anticipated.

For a given hypothetical sample design (where sampling rates do not vary within strata defined by the interaction of service branch, pay grade, and gender but might vary across them), if we assume prespecified response rates (that also may vary across these strata but do not vary within them), we can devise hypothetical poststratified weights and apply the Kish formula (Kish, 1968) to determine the effective sample size for analyses that involve the full sample or composites of strata (i.e., subgroups).[4] The 2016 Workplace and Gender Relations

---

[2] See Meadows et al., 2021.

[3] For example, a comparison across two groups with an effective sample size of 2,500 of a dichotomous outcome that has a populationwide endorsement rate of 1 percent in the first group and 1.96 percent in the second group can be done with 80-percent power (assuming a significance level of 5 percent). A similar comparison across two groups of an effective sample size of 1,000 can be performed with 80-percent power when the first group has a populationwide endorsement rate of 1 percent and the second group has a rate of 2.68 percent.

[4] The effective sample size for a hypothetical sample was calculated under the assumption that each responding service member in a given stratum (where strata are the interaction of service branch, pay grade, and gender) was assigned a weight that was equal to the number of individuals in that stratum from the population divided by the number of respondents from that stratum. Using these weights, we used the Kish formula,

Survey of Active Duty Members (WGRA) was used to provide the best indicator of response rates that could be expected across strata because it was a large, DoD-wide survey that had recently been conducted. This 2016 WGRA was used in lieu of the 2015 HRBS because the methodologies used in fielding the former survey were more in line with those employed for the 2018 HRBS. By taking the WGRA-based anticipated response rates into account, we were able to create a sampling design (as described below) that would minimize the design effect (i.e., loss of precision) while ensuring (to the degree possible) that the desired thresholds for the effective sample size of analyses of composite strata were satisfied.

In order to meet the threshold requirements for effective sample size within domains and composite strata, it proved optimal to oversample from less-prevalent strata (e.g., those containing women, Marines) and sample from more-prevalent strata at lower rates. Specifically, women were sampled at approximately twice the rate of men. Service members from the Coast Guard and Marine Corps were sampled at approximately 1.5 times a baseline rate, whereas Air Force service members were sampled at approximately 0.75 times the baseline rate. Lastly, junior enlisted service members (pay grades E1–E4) were sampled at approximately 1.15 times the baseline rate. More-dramatic oversampling was not needed because in many cases, more-prevalent strata (e.g., those involving Army and/or junior enlisted personnel) were those that were assumed to have lower response rates, whereas less-prevalent strata (e.g., those involving Coast Guard personnel and/or senior officers) were assumed to have higher response rates. The sampling rates were scaled so that exactly 150,004 service members would be sampled in total. A holdback sample of 49,999 service members was also selected to help protect against lower-than-anticipated response rates.

Table 2.1 shows the sampling rates, expected response patterns, and expected effective sample sizes across domains for the 2018 HRBS sampling design while using expected response patterns from the 2016 WGRA. The figures in the table were used for precision calculations that served to validate the proposed sample design and assess whether the desired thresholds for effective sample size would be met.

Final Analytic Sample

Figure 2.1 provides a flowchart showing how the research team arrived at the final analytic sample of 16,475 surveys. The chart begins with the 17,995 individuals who logged into the survey website. Just under 1,000 chose not to proceed through the front material to the first question. An additional 596 cases were dropped because they were not considered a usable survey, which we defined as one in which the respondent provided at least one response to an alcohol-related item. This is similar to how a usable survey was defined for the active component in both the 2015 and 2018 HRBSs.

$$DEFF \approx \frac{n\sum w_i^2}{\left(\sum w_i\right)^2},$$

to approximate the design effect for an analysis across any a given stratum (or composite of strata); the approximated design effect then yielded an approximate effective sample size (where $ESS = n/DEFF$). Note that unlike the process outlined here, our method used to determine final 2018 HRBS weights accounted for variables (e.g., race/ethnicity) other than those that defined strata; therefore, the final design effect might be higher than that which was used in these preliminary calculations.

Table 2.1
2018 Health Related Behaviors Survey Sampling Frame

	Sampling Frame	Number Selected	Number of Expected Respondents[a]	Expected Effective Sample Size[b]	Sampling Rate
All reserve component	802,255	198,320	34,644	21,331	24.7%
Service branch					
Air Force Reserve	68,576	13,047	3,695	2,858	19.0%
Air Force Air National Guard	106,162	19,301	6,212	4,906	18.2%
Army Reserve	191,338	49,402	8,070	4,772	25.8%
Army National Guard	341,075	85,691	11,060	6,975	25.1%
Marine Corps[c]	38,359	15,490	1,719	1,359	40.4%
Navy	59,868	14,922	3,157	2,454	24.9%
Coast Guard[c]	6,199	2,151	1,038	899	34.7%
Pay grade					
E1–E4	342,566	101,696	7,720	5,791	29.7%
E5–E6	245,905	51,637	10,527	8,666	21.0%
E7–E9 and W1–W5[d]	102,191	20,629	7,864	6,612	20.2%
O1–O3	61,706	13,714	3,707	3,051	22.2%
O4–O6	59,209	12,328	5,132	4,343	20.8%
Gender					
Male	649,449	135,174	21,402	14,950	20.8%
Female	162,128	64,830	13,549	9,866	40.0%
Oversampled strata[c]					
Female, Air Force Reserve	18,522	5,601	1,749	1,572	30.2%
Female, Air National Guard	22,108	6,751	2,416	2,165	30.5%
Female, Army Reserve	45,397	19,051	3,642	2,555	42.0%
Female, Army National Guard	59,418	25,954	3,902	2,910	43.7%
Female, Marine Corps	1,553	1,134	282	237	73.0%
Female, Navy	14,052	5,704	1,219	1,058	40.6%
Female, Coast Guard	1,078	635	341	327	58.9%
E1–E4, Air Force Reserve	17,685	4,201	638	534	23.8%
E1–E4, Air National Guard	28,862	6,555	1,135	964	22.7%
E1–E4, Army Reserve	80,663	24,316	1,505	1,246	30.1%
E1–E4, Army National Guard	172,827	50,213	2,987	2,453	29.1%
E1–E4, Marine Corps	26,030	11,229	824	783	43.1%

Table 2.1—continued

	Sampling Frame	Number Selected	Number of Expected Respondents[a]	Expected Effective Sample Size[b]	Sampling Rate
E1–E4, Navy	15,390	4,712	490	436	30.6%
E1–E4, Coast Guard	1,109	470	141	129	42.4%

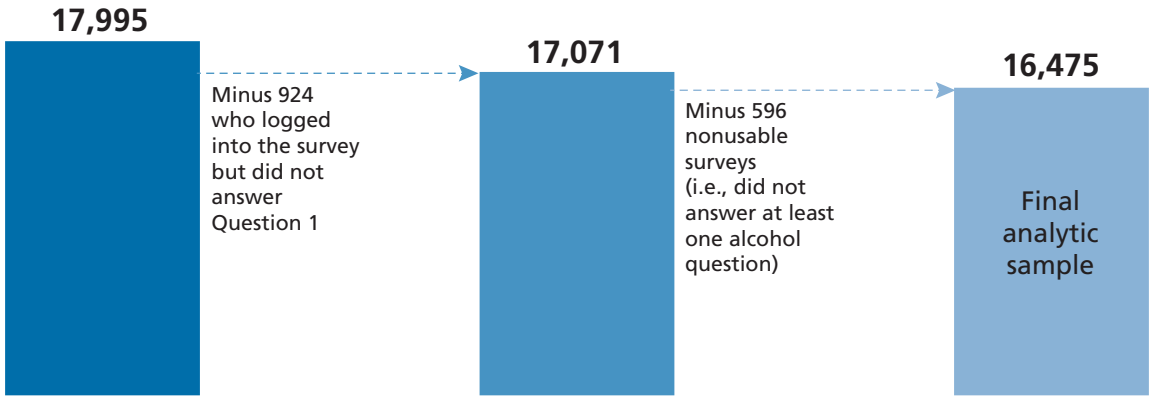
[a] Based on response rates observed in the 2016 WGRA.

[b] Based on design effects calculated using the Kish approximation and hypothetical poststratification weights.

[c] Denotes an oversample. Women were sampled at approximately twice the rate of men. Service members from the Coast Guard and Marine Corps were sampled at approximately 1.5 times the baseline rate, whereas Air Force service members were sampled at approximately 0.75 times the baseline rate. Junior enlisted service members (pay grades E1–E4) were sampled at approximately 1.15 times the baseline rate.

[d] Senior enlisted personnel and warrant officers were combined for the sampling procedure.

Figure 2.1
Flowchart for the 2018 HRBS Final Analytic Sample



NOTE: We do not know whether the 17,995 individuals who logged into the survey viewed the consent screen.

Among those who were included in the final analytic sample, the average completion time was 20.6 minutes (standard deviation = 10.8 minutes). The majority of the sample accessed the survey via a laptop or desktop computer (93.3 percent), with 5.5 percent using a mobile device and 1.1 percent using a tablet.

Response Rates

Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. In this case, *ineligible* refers to sample members who were deceased at the time of the survey (n = 11). This response rate calculation corresponds to American Association for Public Opinion Research Response Rate 1 (American Association for Public Opinion Research, 2016). We also present weighted response rates, using the design weights (weights are described in the next section).

Table 2.2 breaks down the sampling frame, total sample size (including both the primary and holdback samples), and response rates (including noncontacts and surveys in the analytic sample) by service branch, pay grade, and gender. The primary sample size was 150,004, and the secondary sample size was 49,999, for a total sample size of 200,003. The overall

Table 2.2
Sampling Frame, Sample Size, and Response Rates, Overall Sample

	Sampling Frame	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Un-weighted Response Rate (%)[b]	Weighted Response Rate (%)
Service branch								
Air Force Reserve	68,576	13,047	9,785	3,262	35	2,095	16.1	16.2
Air National Guard	106,162	19,301	14,476	4,825	101	3,111	16.1	16.6
Army Reserve	191,338	49,402	37,053	12,349	402	3,829	7.8	8.4
Army National Guard	341,074	85,690	64,267	21,423	1,454	4,930	5.8	6.3
Marine Corps Reserve	38,359	15,490	11,618	3,872	2,074	497	3.2	3.4
Navy Reserve	59,868	14,922	11,191	3,731	11	1,667	11.2	12.0
Coast Guard Reserve	6,199	2,151	1,614	537	4	346	16.1	15.6
Pay grade								
E1–E4	342,566	101,696	76,272	25,424	3,897	3,358	3.3	3.4
E5–E6	245,905	51,637	38,728	12,909	44	4,708	9.1	9.3
E7–E9	89,184	17,916	13,415	4,501	3	3,680	20.5	21.1
W1–W5	13,007	2,713	2,058	655	20	440	16.2	16.1
O1–O3	61,706	13,714	10,286	3,428	112	1,530	11.2	11.2
O4–O6	59,208	12,327	9,245	3,082	5	2,759	22.4	22.7
Gender								
Men	649,448	135,173	101,381	33,792	3,187	10,754	8.0	9.2
Women	162,128	64,830	48,623	16,207	894	5,721	8.8	10.0
Total	811,576	200,003	150,004	49,999	4,081	16,475	8.2	9.4

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

unweighted response rate for the reserve component was 8.2 percent (9.4 percent weighted).[5] The response rate was highest among the Air Force Reserve, Air Force Air National Guard, and Coast Guard (all at 16.1 percent unweighted and 16.2, 16.6, and 15.6 weighted response rates, respectively) and lowest among the Marine Corps Reserve (3.2 percent unweighted and 3.4 percent weighted). Senior officers (O4–O7) were the most likely to respond (22.4 percent

[5] The overall unweighted response rate for the 2018 HRBS, including both active and reserve components, was 8.4 percent, and the overall weighted response rate was 9.5 percent.

unweighted and 22.7 percent weighted), and junior enlisted personnel (E1–E4) were the least likely to respond (3.3 percent unweighted and 3.4 percent weighted).

Tables 2.3 through 2.9 provide a summary of the total sample size (including both the primary and holdback samples) and response rates (both weighted and unweighted) for each service branch, broken down by pay grade and gender. Note that weighted and unweighted response rates in each gender–by–pay grade group are identical because they are based on the design weight, which accounts only for service branch, gender, and pay grade.

Table 2.3
Sample Size and Response Rates, Air Force Reserve

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	2,189	1,642	547	12	206	9.4	9.4
E5–E6	2,639	1,979	660	0	368	13.9	13.9
E7–E9	1,241	931	310	0	299	24.1	24.1
O1–O3	350	262	88	1	48	13.7	13.7
O4–O7	1,027	770	257	0	208	20.3	20.3
Total	7,446	5,584	1,862	13	1,129	15.2	15.6
Women							
E1–E4	2,012	1,509	503	20	247	12.3	12.3
E5–E6	1,729	1,297	432	1	285	16.5	16.5
E7–E9	844	633	211	0	189	22.4	22.4
O1–O3	325	244	81	1	65	20.0	20.0
O4–O7	691	518	173	0	180	26.0	26.0
Total	5,601	4,201	1,400	22	966	17.2	17.7
Air Force Reserve total	13,047	9,785	3,262	35	2,095	16.1	16.2

NOTE: The Air Force does not use warrant officers.

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.4
Sample Size and Response Rates, Air National Guard

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	3,873	2,905	968	61	334	8.6	8.6
E5–E6	4,532	3,399	1,133	0	628	13.9	13.9
E7–E9	2,441	1,831	610	0	667	27.3	27.3
O1–O3	627	470	157	0	107	17.1	17.1
O4–O7	1,077	808	269	0	264	24.5	24.5
Total	12,550	9,413	3,137	61	2,000	17.2	16.5
Women							
E1–E4	2,682	2,012	670	40	311	11.6	11.6
E5–E6	2,135	1,601	534	0	331	15.5	15.5
E7–E9	1,112	834	278	0	272	24.5	24.5
O1–O3	392	294	98	0	67	17.1	17.1
O4–O7	430	322	108	0	130	30.2	30.2
Total	6,751	5,063	1,688	40	1,111	15.9	17.0
Air National Guard Total	19,301	14,476	4,825	101	3,111	16.1	16.3

NOTE: The Air National Guard does not use warrant officers.

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.5
Sample Size and Response Rates, Army Reserve

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	14,544	10,908	3,636	198	464	3.2	3.2
E5–E6	7,409	5,557	1,852	5	560	7.6	7.6
E7–E9	2,959	2,208	751	1	526	17.8	17.8
W1–W5	574	442	132	3	95	16.6	16.6
O1–O3	2,545	1,909	636	8	258	10.1	10.1
O4–O7	2,320	1,740	580	0	523	22.5	22.5
Total	30,351	22,764	7,587	215	2,426	8.0	8.6
Women							
E1–E4	9,772	7,329	2,443	180	321	3.3	3.3
E5–E6	4,013	3,010	1,003	0	307	7.7	7.7
E7–E9	1,684	1,257	427	0	295	17.5	17.5
W1–W5	190	149	41	0	31	16.3	16.3
O1–O3	2,110	1,582	528	7	204	9.7	9.7
O4–O7	1,282	962	320	0	245	19.1	19.1
Total	19,051	14,289	4,762	187	1,403	7.4	7.9
Army Reserve total	49,402	37,053	12,349	402	3,829	7.8	8.4

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.6
Sample Size and Response Rates, Army National Guard

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	33,047	24,785	8,262	754	684	2.1	2.1
E5–E6	14,850	11,138	3,712	6	968	6.5	6.5
E7–E9	4,479	3,351	1,128	2	838	18.7	18.7
W1–W5	1,493	1,128	365	12	234	15.7	15.7
O1–O3	3,985	2,989	996	68	349	8.8	8.8
O4–O7	1,882	1,411	471	1	420	22.3	22.3
Total	59,736	44,802	14,934	843	3,493	5.8	6.4
Women							
E1–E4	17,166	12,874	4,292	582	444	2.6	2.6
E5–E6	5,239	3,929	1,310	3	459	8.8	8.8
E7–E9	1,128	844	284	0	215	19.1	19.1
W1–W5	312	236	76	5	52	16.7	16.7
O1–O3	1,568	1,176	392	20	160	10.2	10.2
O4–O7	541	406	135	1	107	19.8	19.8
Total	25,954	19,465	6,489	611	1,437	5.5	6.1
Army National Guard total	85,690	64,267	21,423	1,454	4,930	5.8	6.3

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.7
Sample Size and Response Rates, Marine Corps Reserve

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	10,663	7,997	2,666	2,014	150	1.4	1.4
E5–E6	1,866	1,400	466	26	84	4.5	4.5
E7–E9	524	398	126	0	53	10.1	10.1
W1–W5	84	58	26	0	13	15.5	15.5
O1–O3	474	356	118	5	41	8.6	8.6
O4–O7	745	559	186	1	86	11.5	11.5
Total	14,356	10,768	3,588	2,046	427	3.0	3.3
Women	10,663	7,997	2,666	2,014	150		
E1–E4	566	424	142	25	14	2.5	2.5
E5–E6	299	224	75	3	19	6.4	6.4
E7–E9	59	43	16	0	8	13.6	13.6
W1–W5	8	7	1	0	2	25.0	25.0
O1–O3	61	46	15	0	9	14.8	14.8
O4–O7	141	106	35	0	18	12.8	12.8
Total	1,134	850	284	28	70	6.2	6.7
Marine Corps Reserve total	15,490	11,618	3,872	2,074	497	3.2	3.4

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.8
Sample Size and Response Rates, Navy Reserve

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	2,792	2,094	698	4	76	2.7	2.7
E5–E6	3,559	2,669	890	0	333	9.4	9.4
E7–E9	746	560	186	0	154	20.6	20.6
W1–W5	13	9	4	0	3	23.1	23.1
O1–O3	660	495	165	0	110	16.7	16.7
O4–O7	1,448	1,086	362	1	389	26.9	26.9
Total	9,218	6,913	2,305	5	1,065	11.6	12.2
Women							
E1–E4	1,920	1,440	480	3	62	3.2	3.2
E5–E6	2,336	1,752	584	0	231	9.9	9.9
E7–E9	412	308	104	0	89	21.6	21.6
W1–W5	5	5	0	0	0	0.0	0.0
O1–O3	457	343	114	2	78	17.1	17.1
O4–O7	574	430	144	1	142	24.7	24.7
Total	5,704	4,278	1,426	6	602	10.6	11.2
Navy Reserve total	14,922	11,191	3,731	11	1,667	11.2	12.0

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Table 2.9
Sample Size and Response Rates, Coast Guard Reserve

	Total Sample Size	Primary Sample Size	Holdback Sample Size	Non-contacts[a]	Analytic Sample Size	Unweighted Response Rate (%)[b]	Weighted Response Rate (%)
Men							
E1–E4	341	256	85	4	26	7.6	7.6
E5–E6	743	557	186	0	89	12.0	12.0
E7–E9	207	156	51	0	51	24.6	24.6
W1–W5	25	18	7	0	5	20.0	20.0
O1–O3	96	72	24	0	18	18.8	18.7
O4–O7	104	78	26	0	25	24.0	24.0
Total	1,516	1,137	379	4	214	14.1	14.5
Women							
E1–E4	129	97	32	0	19	14.7	14.7
E5–E6	288	216	72	0	46	16.0	16.0
E7–E9	80	61	19	0	24	30.0	30.0
W1–W5	9	6	3	0	5	55.6	55.6
O1–O3	64	48	16	0	16	25.0	25.0
O4–O7	65	49	16	0	22	33.8	33.8
Total	635	477	158	0	132	20.8	20.1
Coast Guard Reserve total	2,151	1,614	537	4	346	16.1	15.6

[a] Noncontacts includes sample members for whom we did not have either a mailing or email address in the DMDC sample data file.

[b] Response rates were calculated as [number of submitted surveys / (number of released sample – ineligibles)] × 100. *Ineligibles* are defined as deceased.

Analytic Weights

The 2018 HRBS analytic sample differs in composition from the eligible DoD service member population from which it was drawn for two primary reasons: (1) sample design (i.e., we selected specific types of service members for inclusion in the sample at a higher rate than other types of service members to insure adequate representation of important subgroups) and (2) non-response (i.e., specific types of sampled service members were more likely to respond to the survey). Such differences in composition have the potential to jeopardize the generalizability of results collected from the survey to the greater population of survey-eligible service members. In order for estimates based on the respondents be generalizable to the respective population, the sample must be weighted so that types of service members that are underrepresented in the sample are given more emphasis than those who are overrepresented. Therefore, weighting

hinges on the ability of the analyst to quantify differences between the set of respondents and the greater population from which they were collected.

Unlike the anonymous 2015 HRBS, the 2018 HRBS was confidential, which allowed us to link both respondents and nonrespondents to DMDC administrative files containing demographic information (e.g., service branch, age, education, race/ethnicity). This information was used to quantify the ways in which our respondents differed from the broader population of survey-eligible service members. We calculated analytic weights in two stages. First, we estimated design weights that counteracted the survey design, which slightly oversampled Marines, women, and junior enlisted personnel to guarantee enough of those groups to yield reliable estimates. Second, we calculated nonresponse weights, which were used to make the respondents representative of those who were selected for sampling. The final analytic weights were calculated as the product of the design and nonresponse weights and were used to make the analytic sample representative of the eligible service member population.

Design Weights

As outlined above, the sample design for the 2018 HRBS sample involved segmentation of the eligible population into 50 strata based on the interaction of service branch, pay grade, and gender. Service members in the same stratum were randomly sampled with the same probability, although these probabilities differ across strata. A service member's design weight is the inverse of his or her probability of being selected for sampling. Specifically, the design weight is equal to the number of eligible individuals in the service member's respective stratum divided by the number that were selected for sampling from that stratum.

Nonresponse Weights

Nonresponse weights were also computed as inverse probability weights, where the probability of being a respondent was estimated using a statistical model. This process gives greater weight to those respondents who look most similar to the nonrespondents across a large set of demographic and military characteristics. The process results in a set of analytic weights that yield an analytic sample that closely matches the full survey-eligible military population on a wide range of characteristics, as shown in Table 2.10.

The nonresponse weights were derived using the Toolkit for Weighting and Analysis of Nonequivalent Groups (TWANG) package (Ridgeway et al., 2014) in the R statistical programming language. This package uses a machine learning regression model, Generalized Boosted Models (GBM), to estimate each sampled individual's probability of being a respondent. GBM (Ridgeway, 2005) is a general, automated, data-adaptive modeling algorithm that can estimate the relationship between a variable of interest and a large number of covariates of mixed type, while also allowing for flexible nonlinear relationships between the covariates and the response propensity (Friedman, 2001; Ridgeway, 1999). This approach allows for flexible modeling and has been shown to improve upon the performance of logistic regression (McCaffrey, Ridgeway, and Morral, 2004; Ridgeway and McCaffrey, 2007). Specifically, the model attempted to balance the design-weighted respondents to the full sample frame on all the variables included in Table 2.10, as well as all two- and three-way interactions among those variables. The model iteration used for our weights was selected based on the ES.mean criteria in TWANG—i.e., minimizing the mean of the standardized differences between the distribution of respondents and nonrespondents. Thus, the GBM machine learning algorithm stopped

Table 2.10
Balance Table for Nonresponse Weights

	Sample Frame Percentage	Weighted Respondents Percentage
Service branch		
Air Force Reserve	8.45	8.53
Air National Guard	13.08	13.06
Army Reserve	23.58	23.82
Army National Guard	42.03	41.76
Marine Corps Reserve	4.73	4.76
Navy Reserve	7.38	7.32
Coast Guard Reserve	0.76	0.77
Gender		
Men	80.02	79.61
Women	19.98	20.39
Pay grade		
E1–E4	42.21	42.04
E5–E6	30.30	30.51
E7–E9	11.02	10.91
W1–W5	1.58	1.58
O1–O3	7.60	7.65
O4–O6	7.30	7.31
Race/ethnicity		
Non-Hispanic white	63.87	63.91
Non-Hispanic black	15.83	15.73
Hispanic	12.96	12.92
Non-Hispanic Asian	4.92	5.10
Other	2.43	2.34
Marital status		
Married	47.04	47.13
Divorced, separated, or widowed	7.39	7.56
Never married	45.56	45.31
Education		
High school or less	52.50	52.07
Some college	22.95	23.21
College degree	24.54	24.71

Table 2.10—continued

	Sample Frame Percentage	Weighted Respondents Percentage
Number of dependent children		
0	56.06	56.30
1	14.00	13.93
2	16.00	16.10
3+	13.94	13.67
DoD occupation code		
10	15.33	15.30
11	4.02	3.99
12	5.68	5.63
13	5.28	5.40
14	3.01	3.00
15	15.09	15.15
16	12.24	12.38
17	5.24	5.19
18	13.25	13.25
19	4.50	4.36
20	0.98	0.99
21	0.16	0.17
22	3.51	3.51
23	1.28	1.24
24	1.85	1.87
25	1.12	1.15
26	2.31	2.29
27	1.46	1.46
28	1.57	1.56
29	2.14	2.11
	Mean (standard deviation)	**Mean (standard deviation)**
Age in years	32.0 (9.9)	32.0 (10.4)
Armed Forces Qualification Test (AFQT) percentile	61.6 (19.3)	61.6 (19.5)
Months deployed since September 2001	5.5 (8.4)	5.5 (9.0)
Years of service	10.7 (8.5)	10.7 (9.8)

when the weights achieved the best balance between the cumulative distributions of responders and nonresponders on all of the predictor variables in the model.

The resulting weights create a highly representative sample on many important characteristics, which reduces the threat of serious nonresponse biases in the data, but the weights do slightly decrease the precision of estimates based on the respondents. Specifically, the overall design effect (Kish, 1968) of the final analytic weight was 2.68. This implies that our sample of 16,475 respondents offers the statistical precision that would be achieved by a simple random sample of the population of 6,147 (16,475/2.68) when used to estimate characteristics of the entire active-duty force. However, the design effect is somewhat smaller when used to estimate characteristics of subgroups of the overall population (e.g., estimates among Marines). All estimates based on the 2018 sample that are presented in this report account for the effect of these weights on both the means and the variances of the estimates.

Note that the generalizability of weighted HRBS findings to the population of survey-eligible service members is predicated on a handful of assumptions. These include (1) that that the likelihood of a sampled service member responding to the survey (and, with it, any meaningful differences between respondents and nonrespondents) is dependent only on characteristics that are observed for both respondents and nonrespondents (or, under further assumptions, characteristics for which population benchmarks exist)—this is also known as a missing-at-random assumption; (2) that all sampled respondents have a nonzero probability of responding to the survey; and (3) that the model used to quantify response propensities is of the correct form. Weighted analyses of survey data could be biased if these assumptions are not satisfied; however, it is difficult to assess the validity of these assumptions in practice.

Missing Data and Imputation

Missing values present an obstacle to analysis of survey data. For instance, they can complicate multivariate analyses because, if left unaddressed, the analyst could be forced to use a complete case analysis wherein only cases that have observed data for all variables involved are used, resulting in the exclusion of some observed data. Furthermore, univariate analyses could be confounded by missing data because the unreported values could be systematically different from the reported ones. In this case, an analysis across only observed data may be biased. A common approach for addressing missing data is imputation (Little and Rubin, 2019), wherein a predictive model is used to replace missing values with ones that are statistically plausible. Imputation results in a data set that is more representative of the inferential population and makes more-efficient use of the available data for all cases, even where they did not complete every survey item. Furthermore, imputation can prevent bias when patterns of missingness are completely random or depend on observed data, but it does not prevent bias when patterns of missingness are dependent on unobserved data (Little and Rubin, 2019).

Missingness can occur through two primary means: (1) dropout, which occurs when an individual who began responding to the survey stops midway through and fails to return to complete the survey and (2) refusal, which occurs when an individual fails to respond to a specific item on the survey but does respond to some subsequent items. The bulk of the missingness in the 2018 HRBS (approximately 94 percent) was due to dropout. Missingness rates in the data range from less than 0.1 percent for items appearing early in the survey to 7 percent for items that occur later. For the 2015 HRBS, missing data were not addressed in a rigorous

manner, which is a reasonable approach in settings where rates of missingness are small. However, to improve the rigor and defensibility of findings from HRBS data, it was determined that missing data for the 2018 HRBS would be imputed. The active and reserve components were imputed jointly, although component status was used as a predictor in the imputation model. We created and analyzed a single imputed data set in lieu of multiple ones because the rates of missingness were not deemed high enough to warrant the use of the complex analytical tools needed to produce estimates from multiply imputed data.

Imputations were created using mice in R (Van Buuren and Groothuis-Oudshoorn, 2011), which allows its user to specify the imputation method used for each variable (e.g., gaussian imputation, logistic imputation, polytomous imputation, predictive mean matching [PMM]), as well as the dependencies for each variable that is to be imputed. We used PMM (Little, 1988) to impute binary, ordinal, and continuous variables, whereas polytmous regression was used to impute categorical data. Logistic regression was not used as a manner of imputing binary data because it performed poorly for imputing variables with sparse distributions which are common in HRBS data. Particular attention was paid to the complicated skip logic that underpins the HRBS survey instrument. Furthermore, a sequentially specified imputation model (in lieu of a fully specified one) was needed to prevent divergence across iterations of the Markov chain Monte Carlo (MCMC) procedure employed within mice. For final imputations, five iterations of MCMC were used, as this is recommended within existing literature (White, Royston, and Wood, 2011, Van Buuren, 2018). More details about the imputation procedure can be found in Appendix E.

Analysis Approach

All analyses, unless otherwise noted, used the analytic weights and imputations previously described. Variance inflation due to weighting was handled in the survey procedures of SAS 9.4. Confidence intervals (CIs) for all estimates were computed using the Wald method.

Comparisons Across Military Subpopulations

In most circumstances, differences in each outcome were tested across levels of key factors or by subgroups (service branch, pay grade, and gender; see Chapter Three).[6] This was done in a two-step procedure that was designed to ensure that significance testing maintained a 0.05 probability of any false positive (Type I) error across all of the pairwise comparisons on a single outcome implied by the levels of each factor. This correction for family-wise error, or multiple testing, was done separately for each outcome and for each factor that defined separate military subpopulations. For example, there were 20 possible pairwise comparisons across the seven military service branch and component groups. When analyzing a single outcome, we wished to conduct significance testing in a manner that ensured a 0.05 probability of any false positive across those 20 comparisons. To do this, we first used the Rao-Scott chi-square test as an overall test of the relationship between the outcome and the factor. This tested the hypothesis that there was any difference in the outcome across all levels of the factor. If this test concluded that there was a $p < 0.05$ significant relationship between the outcome and the factor, then we attempted to identify the levels of the factor in which the outcome differed by

[6] Results by race/ethnicity and age groups can be found in Appendix D.

constructing all possible pairwise comparisons of the outcome across the levels of the factor. We used a simple *t*-test and adjusted the *p*-values for multiple comparisons using the Tukey-Kramer adjustment (Tukey, 1953), which was designed to account for the multiple testing associated with all possible pairwise comparisons across factor levels.

In cases where one or more subgroup had a zero on a particular outcome, those subgroups were omitted from the computation of the Rao-Scott chi-square text and were not included in pairwise comparisons. In cases where estimates were suppressed (see below), we omitted subgroups that have suppressed estimates in pairwise comparisons.

It is worth noting that our corrections for familywise error due to multiple comparisons were done separately for each outcome and were only conducted when testing for equality across military subpopulations. Because the report covers a wide range of outcomes and the analyses are designed to meet the needs of a diverse audience, it contains significance tests for a very broad range of possible hypotheses of interest. Although the procedures used are designed to produce significance testing with a 0.05 probability of a false positive when the null hypothesis is true for each individual test, if the reader draws conclusions that depend on inferences across a large number of tests, these procedures will not result in a 0.05 probability of a false positive that any of the tests are significant. For example, if we test for gender differences across 40 separate outcomes, each of these tests has a 0.05 probability of a false positive, but the probability that one or more of the 40 tests will result in a false positive is considerably higher than 0.05. If the reader wishes to control for familywise error across a specific set of tests they are interpreting together, we would encourage them to perform a Bonferroni correction (Dunn, 1961) across the relevant family of tests to rescale the *p*-values we present in a way that controls for family-wise Type 1 error. The reader should bear in mind, however, that such techniques are known to apply a very strict threshold for statistical significance (especially when considered across a large number of tests) and, as such, could lead to a large number of false negatives. Therefore, procedures that instead control the false discovery rate (e.g., Benjamini and Hochberg, 1995) should be considered as well.

Comparisons with Healthy People 2020 Objectives

For roughly the past 30 years, the Office of Disease Prevention and Health Promotion has developed a set of evidence-based objectives aimed at improving the health of American citizens. Benchmarks are established for ten-year cycles, and the current set of goals is outlined in HP2020. Department of Defense Instruction (DoDI) 1010.10 states that it is DoD policy to "[s]upport the achievement of the Department of Health and Human Services' vision for improving the health of all Americans as outlined in Healthy People 2020." As such, where possible, this report will compare results from the 2018 HRBS to HP2020 objectives. In some cases, which are identified in subsequent chapters of the report, the comparability of measures between the HRBS and HP2020 objectives was not exact because of differences between HRBS data and that used in the construction of HP2020 objectives. Furthermore, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest.

Comparisons with the 2018 HRBS Active Component Sample

Because of the differences in demographic characteristics between active and reserve component members, direct comparison of the results for these two groups could be misleading. We

attempted to minimize these differences by comparing the two groups using regression models in which we simultaneously controlled for many of the demographic differences across the two samples. For most outcomes, we controlled for the following characteristics: service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade (to account for differences in the distribution of pay grade across the services and by component). The models for low-prevalence outcomes (identified in each substantive chapter) collapsed warrant officers and officers into a single group, collapsed DoD occupation codes into combat versus noncombat codes, and dropped the interaction between service branch and pay grade, as well as the missing flags for both race/ethnicity and education level. Models did not use weights. Full model results are available upon request.

Comparative results use adjusted risk ratios (ARRs) based on regression models and are presented at the end of each substantive chapter and summarize differences across all key outcomes. The ARRs can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20 percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted risk ratios (RRs) to give the reader a sense of how much adjustment for demographic characteristics matters for the comparisons.

When interpreting ARRs and percentage changes between populations, it is important to keep in mind the base for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Suppression of Results

In some cases, point estimates and/or CIs are not shown in the tables. We did this for two reasons. First, and as noted earlier, we suppressed estimates to protect the confidentiality of respondents. And, second, we did this to identify when estimates might be so unstable as to not be considered reliable. In the first case of suppression, both point estimates and CIs were suppressed when fewer than 15 service members were included in the denominator of any given cell—that is, when the eligible population was less than 15. In the second case of suppression, CIs, but not point estimates, are provided. This occurs when the half-width of a CI is 15 percent or greater (i.e., greater than the point estimate itself). As noted earlier, in cases where estimates were suppressed, we omitted subgroups that had suppressed estimates in pairwise comparisons.

Limitations

The 2018 HRBS is not without limitations. First, as with any self-report survey, social desirability bias is always a possibility, especially when topics may be sensitive or unflattering to the respondent. Second, the response rate for the 2018 is considered low for survey research. Although low response rates do not automatically mean that survey data are biased, they do increase the probability of bias. The direction of this possible bias, however, is unclear. One way we addressed this potential bias with respect to nonresponse was through the use of weights. Third, for some groups that comprise a smaller percentage of the overall DoD population (e.g., warrant officers, non-Hispanic Asian service members), CIs of our estimates might be larger, indicating a lower level of precision in the estimate. Thus, these results should be interpreted with caution. And, fourth, direct comparisons between civilians and reserve component service members may not be appropriate given demographic difference between the two populations. To address this, we used a regression model approach to facilitate making these comparisons.

CHAPTER THREE

Demographics

This chapter presents key demographics of the 2018 HRBS reserve component weighted respondent sample and is designed to provide context for the substantive chapters that follow. The companion report to this one provides similar context for the 2018 HRBS active component weighted respondent sample.[1] Of the overall 2018 HRBS weighted sample, 62.6 percent are in the active component, and 37.4 percent are in the reserve component.

Service Branch, Pay Grade, and Gender

Table 3.1 presents the distribution of the weighted 2018 HRBS reserve component sample by the three characteristics used for sampling: service branch, pay grade, and gender. The final column in the table compares the weighted 2018 HRBS with the 2017 DoD reserve component population.[2] Not surprisingly, the weighted 2018 HRBS sample looks almost identical to the DoD population because the weights were designed to do just that.

According to both the 2018 HRBS weighted respondent sample and the 2017 DoD population, the largest reserve components are affiliated with the Army (roughly two-thirds of all reserve component service members are in the Army National Guard or Army Reserve), followed by the Air Force components (Reserve and Air Guard), Navy Reserve, Marine Corps Reserve, and Coast Guard Reserve. The majority of reserve component service members are junior enlisted personnel in the ranks of E1 to E4 (42.0 percent), followed by those in the E5 and E6 pay grades (30.5 percent), senior enlisted officers in the pay grades of E7 to E9 (10.9 percent), junior officers in pay grades O1 to O3 (7.6 percent), midgrade officers in the pay grades O4 to O6 (7.3 percent), and warrant officers in all grades (1.5 percent). Approximately 80 percent of DoD reserve component service members are men.

Tables 3.2 and 3.3 present other cross-tabulations based on the sample strata variables that might be of interest (i.e., service branch, pay grade, and gender). Note that these tables do not include CIs or use significance tests because the respondent sample was weighted to exactly match the sampling frame on service branch, pay grade, and gender. These variables are taken from DMDC personnel files. Key findings include the following:

---

[1] See Meadows et al., 2021. Note that the HRBS sampled only from the Select Reserve. The Coast Guard Reserve is included in the Select Reserve.

[2] We used FY 2017 data for two reasons. First, this time period coincided with the timing of sample selection. Second, comparable FY 2018 data were not available at the time of the writing of this report.

Table 3.1
Distribution of Service Branch, Pay Grade, and Gender in the 2018 HRBS Reserve Component Weighted Respondent Sample, with 2017 DoD Comparison

	2018 HRBS Weighted Respondent Sample with Coast Guard (%)	2017 DoD Reserve Component Population (%)
Service branch		
Air Force Reserve	8.5	8.4
Air National Guard	13.1	13.0
Army Reserve	23.8	23.8
Army National Guard	41.8	42.2
Marine Corps Reserve	4.8	4.7
Navy Reserve	7.3	7.1
Coast Guard Reserve	0.8	0.8
Pay grade		
E1–E4	42.0	42.1
E5–E6	30.5	30.5
E7–E9	10.9	11.2
W1–W5	1.5	1.5
O1–O3	7.6	7.5
O4–O6	7.3	7.0
Gender		
Men	79.6	80.4
Women	20.4	19.6

SOURCE: Information in the first column comes from the 2018 HRBS; the second column is from U.S. Department of Defense, Defense Manpower Data Center, Reserve Components Common Personnel Data System (September 2017), Alexandria, Va.: Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, 2018.

- The Marine Corps Reserve is the service branch with the largest proportion of junior enlisted personnel. Almost two-thirds of the force is in the pay grades of E1 to E4 (Table 3.2).
- The Marine Corps Reserve has the smallest percentage of women, while the Air Force Reserve has the largest (Table 3.2).
- The percentage of women declines with increasing seniority for both enlisted personnel and officers, while the reverse is true for men (Table 3.3). This is consistent with observed trends in retention by gender (DoD, 2017b).

Table 3.2
Pay Grade by Service Branch, Weighted Respondent Sample

	Air Force Reserve (%)	Air National Guard (%)	Army Reserve (%)	Army National Guard (%)	Marine Corps Reserve (%)	Navy Reserve (%)	Coast Guard Reserve (%)
Pay grade							
E1–E4	26.7	28.6	44.2	49.5	65.7	21.4	18.4
E5–E6	38.7	36.8	26.2	27.9	18.4	45.1	45.5
E7–E9	16.6	19.8	10.3	8.4	3.9	8.6	17.1
W1–W5	NA	NA	1.5	2.8	1.0	0.1	2.1
O1–O3	4.8	5.7	9.3	8.0	5.1	8.5	8.5
O4–O6	13.2	9.0	8.4	3.5	6.0	16.4	8.5
Gender							
Men	72.1	78.7	77.5	81.4	94.5	76.7	79.6
Women	27.9	21.3	22.5	18.6	5.5	23.3	20.4

NOTES: All data are weighted. NA = not applicable; the Air Force does not use warrant officers.

Table 3.3
Gender by Pay Grade, Weighted Respondent Sample

	E1–E4 (%)	E5–E6 (%)	E7–E9 (%)	W1–W5 (%)	O1–O3 (%)	O4–O6 (%)
Men	78.0	80.7	82.1	88.3	77.0	81.5
Women	22.0	19.3	17.9	11.7	23.0	18.5

NOTE: All data are weighted.

Age

Age in years was obtained from DMDC personnel data files and calculated as of September 1, 2018. Table 3.4 presents the percentage of service members in each age group in the full 2018 HRBS weighted respondent sample and by service branch, Table 3.5 presents age groups by pay grade, and Table 3.6 presents age groups by gender. Key findings include the following:

- The Marine Corps Reserve has the largest population of young service members (Table 3.4), consistent with the finding that it also has the largest population of junior enlisted service members. The Air Force Reserve and Air Guard, Army Reserve and National Guard, and Coast Guard Reserve all have higher percentages of service members over age 35.
- As expected, age and pay grade are positively related such that the higher one's pay grade, the higher their age (Table 3.5).
- The gender distribution by pay grade skews somewhat to the left for women and right for men (Table 3.6).

Table 3.4
Age Groups by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Ages 17–24	14.1% (11.5–16.7)	18.4% (16.5–20.3)	26.4% (23.8–29.0)	33.0% (30.8–35.3)	51.7% (45.7–57.7)	14.9% (10.8–19.1)	2.4% (0.4–4.4)
Ages 25–34	39.1% (36.3–41.9)	34.7% (32.5–36.9)	36.8% (34.5–39.2)	37.7% (35.6–39.7)	35.1% (29.6–40.6)	37.4% (33.8–41.1)	42.5% (35.0–50.1)
Ages 35–44	29.5% (27.2–31.8)	28.9% (27.1–30.7)	22.1% (20.6–23.7)	18.6% (17.4–19.8)	10.5% (8.3–12.7)	30.3% (27.4–33.2)	38.2% (31.8–44.5)
Ages 45+	17.4% (15.8–18.9)	18.0% (16.7–19.2)	14.7% (13.6–15.7)	10.7% (10.0–11.5)	2.7% (1.9–3.5)	17.3% (15.5–19.2)	16.9% (13.0–20.9)

NOTE: All data are weighted.

Table 3.5
Age Groups by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Ages 17–24	59.5% (57.3–61.7)	5.7% (4.7–6.8)	0.0% (0.0–0.1)	0.5% (0.0–1.4)	6.1% (4.1–8.1)	0.0% (0.0–0.1)
Ages 25–34	35.2% (33.1–37.4)	54.4% (52.6–56.2)	9.3% (8.0–10.6)	17.7% (11.8–23.7)	52.7% (49.4–55.9)	5.0% (3.9–6.1)
Ages 35–44	4.5% (4.0–5.1)	29.7% (28.2–31.2)	46.2% (44.3–48.1)	38.1% (32.3–43.8)	31.6% (28.9–34.4)	44.9% (42.8–47.1)
Ages 45+	0.7% (0.5–0.9)	10.2% (9.4–10.9)	44.5% (42.7–46.3)	43.7% (38.2–49.3)	9.6% (7.9–11.2)	50.1% (48.0–52.2)

NOTE: All data are weighted.

Table 3.6
Age Groups by Gender, Weighted Respondent Sample

	Men	Women
Ages 17–24	26.0% (24.4–27.5)	32.2% (30.1–34.4)
Ages 25–34	36.9% (35.5–38.3)	37.9% (36.1–39.7)
Ages 35–44	23.0% (22.1–23.9)	19.6% (18.5–20.7)
Ages 45+	14.1% (13.5–14.7)	10.3% (9.6–11.0)

NOTE: All data are weighted.

Race/Ethnicity

Respondents' race/ethnic status was also taken from DMDC personnel files. Race/ethnicity was hierarchically coded such that ethnicity (i.e., Hispanic) was coded first and outweighs any other racial category. The Other racial/ethnic group includes those who selected multiple racial groups but did not also select Hispanic as their ethnicity. Table 3.7 presents race/ethnicity by service branch, Table 3.8 by pay grade, and Table 3.9 by gender. Key findings include the following:

- The Coast Guard Reserve has the highest percentage of non-Hispanic white members, while the Navy Reserve has the lowest (Table 3.7). Hispanic and non-Hispanic black are the two most prevalent minority race/ethnic groups across all the service branches.
- Racial/ethnic diversity decreases as pay grade increases, though this is more apparent in the officer ranks (Table 3.8).
- Servicewomen are more diverse than servicemen, with a larger percentage of servicewomen identifying as a member of a racial/ethnic minority group (Table 3.9).

Table 3.7
Race/Ethnicity by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Non-Hispanic white	63.0% (60.2–65.7)	75.8% (74.0–77.6)	52.5% (50.1–54.9)	69.0% (67.0–70.9)	61.9% (55.8–67.9)	51.3% (47.5–55.1)	81.4% (76.5–86.4)
Non-Hispanic black	16.6% (14.3–18.9)	8.0% (6.8–9.3)	21.8% (19.7–23.8)	14.9% (13.3–16.4)	10.6% (6.8–14.4)	18.6% (15.0–22.1)	2.6% (0.7–4.4)
Hispanic	12.0% (10.2–13.7)	9.5% (8.3–10.7)	16.8% (15.1–18.5)	11.0% (9.7–12.3)	20.0% (14.6–25.4)	13.8% (11.5–16.1)	10.0% (5.9–14.2)
Non-Hispanic Asian	4.9% (3.7–6.1)	3.6% (2.9–4.3)	8.1% (7.0–9.1)	3.5% (2.9–4.1)	5.4% (3.1–7.7)	7.8% (5.0–10.6)	1.3% (0.1–2.5)
Other	3.6% (2.6–4.5)	3.0% (2.3–3.8)	0.9% (0.5–1.2)	1.6% (1.1–2.1)	2.1% (0.4–3.8)	8.5% (6.4–10.6)	4.7% (2.6–6.8)

NOTE: All data are weighted.

Table 3.8
Race/Ethnicity by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Non-Hispanic white	57.0% (54.7–59.3)	63.8% (62.0–65.5)	71.0% (69.2–72.7)	80.1% (75.9–84.4)	74.0% (71.3–76.7)	79.8% (78.2–81.5)
Non-Hispanic black	19.0% (17.1–20.8)	15.2% (13.9–16.5)	14.1% (12.7–15.4)	9.2% (6.2–12.2)	11.3% (9.2–13.4)	7.8% (6.7–9.0)
Hispanic	15.9% (14.3–17.5)	13.2% (12.0–14.4)	10.2% (9.0–11.3)	6.9% (4.5–9.3)	7.5% (6.0–8.9)	5.6% (4.6–6.6)
Non-Hispanic Asian	6.3% (5.4–7.2)	4.7% (4.0–5.4)	2.7% (2.2–3.3)	2.9% (0.7–5.1)	5.2% (3.9–6.4)	3.9% (3.1–4.7)
Other	1.8% (1.3–2.4)	3.1% (2.5–3.8)	2.1% (1.6–2.6)	0.8% (0.1–1.5)	2.1% (1.4–2.8)	2.8% (2.2–3.5)

NOTE: All data are weighted.

Table 3.9
Race/Ethnicity by Gender, Weighted Respondent Sample

	Men	Women
Non-Hispanic white	66.5% (65.1–67.8)	53.9% (51.9–55.8)
Non-Hispanic black	13.7% (12.6–14.7)	23.7% (21.9–25.6)
Hispanic	12.6% (11.7–13.5)	14.1% (12.9–15.4)
Non-Hispanic Asian	5.1% (4.6–5.7)	5.1% (4.4–5.7)
Other	2.1% (1.8–2.5)	3.2% (2.6–3.8)

NOTE: All data are weighted.

Education

Respondent education was derived from DMDC personnel files. Categories were collapsed into three groups: high school or less (including those with a General Educational Development [GED] certificate or high school diploma), some college (including an associate's degree), and bachelor's degree or more (including all advanced and professional degrees, such as a master's degree, Ph.D., or M.D.). Education level is presented by service branch in Table 3.10, by pay grade in Table 3.11, and by gender in Table 3.12. Key findings include the following:

- With the exception of the Air National Guard, the largest educational attainment group across all service branches is high school or less, with the Marine Corps Reserve having the most members in this category (Table 3.10). The Navy Reserve has the largest percentage of members with a college degree or more, followed closely by the Air Force Reserve.
- As expected, as pay grade increases, the percentage of service members with more advanced educational experience also increases (Table 3.11). The most prevalent educational group among junior enlisted is high school or less, where for senior officers it is a college degree or more.
- The largest education group for both men and women is high school or less.

Table 3.10
Education Level by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
High school or less	52.0% (49.2–54.7)	7.5% (6.1–8.8)	57.1% (54.9–59.4)	58.3% (56.4–60.3)	82.2% (79.1–85.2)	59.2% (55.8–62.6)	55.9% (49.1–62.7)
Some college	18.2% (16.3–20.2)	68.2% (66.3–70.2)	14.4% (13.0–15.8)	20.2% (18.7–21.7)	2.3% (1.1–3.5)	9.1% (7.3–10.8)	15.9% (11.4–20.5)
Bachelor's degree or more	29.8% (27.6–32.0)	24.3% (22.7–25.9)	28.5% (26.7–30.2)	21.5% (20.1–22.8)	15.5% (12.8–18.3)	31.7% (28.9–34.6)	28.2% (22.8–33.5)

NOTE: All data are weighted.

Table 3.11
Education Level by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
High school or less	76.8% (75.2–78.5)	51.2% (49.4–53.1)	28.9% (27.1–30.7)	26.0% (20.6–31.4)	4.2% (2.8–5.7)	2.0% (1.3–2.8)
Some college	17.5% (16.0–19.0)	33.8% (32.2–35.4)	42.5% (40.7–44.4)	31.4% (25.8–36.9)	3.6% (2.2–5.1)	1.1% (0.7–1.6)
Bachelor's degree or more	5.7% (5.0–6.4)	15.0% (13.9–16.0)	28.6% (27.0–30.2)	42.6% (36.9–48.3)	92.1% (90.1–94.1)	96.9% (96.0–97.7)

NOTE: All data are weighted.

Table 3.12
Education Level by Gender, Weighted Respondent Sample

	Men	Women
High school or less	53.1% (51.7–54.5)	48.0% (46.1–50.0)
Some college	22.8% (21.7–23.8)	25.0% (23.5–26.4)
Bachelor's degree or more	24.1% (23.2–25.1)	27.0% (25.6–28.4)

NOTE: All data are weighted.

Marital Status

Marital status was derived from a single survey item on the 2018 HRBS. Table 3.13 (by service branch), Table 3.14 (by pay grade), and Table 3.15 (by gender) show the percentage of service members falling into each of the following categories: married; cohabiting (living together but not married); separated, divorced, or widowed; and never married. Key findings include the following:

- With the exception of the Marine Corps Reserve, married is the most common marital status, followed by never married (Table 3.13). The Coast Guard Reserve has the highest percentage of married members.
- A larger percentage of senior enlisted and officers are married than are junior officers and enlisted personnel (Table 3.14).
- A larger percentage of men than women are married, but more women than men are separated, divorced, or widowed (Table 3.15).

Table 3.13
Marital Status by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Married	55.5% (52.7–58.3)	57.3% (55.1–59.5)	45.5% (43.2–47.9)	44.0% (42.0–46.0)	39.4% (33.7–45.0)	57.1% (53.2–61.0)	66.4% (59.7–73.1)
Cohabiting	10.4% (8.7–12.1)	12.3% (10.7–13.8)	11.3% (9.6–13.1)	15.1% (13.4–16.7)	12.5% (8.5–16.4)	10.1% (7.6–12.6)	12.0% (7.1–16.8)
Separated, divorced, or widowed	7.8% (6.5–9.0)	7.3% (6.3–8.3)	9.3% (8.1–10.6)	6.7% (5.8–7.5)	3.9% (1.8–5.9)	8.1% (6.5–9.6)	4.8% (2.6–7.0)
Never married	26.3% (23.5–29.1)	23.1% (21.1–25.2)	33.8% (31.3–36.3)	34.3% (32.1–36.5)	44.3% (38.1–50.6)	24.7% (20.6–28.8)	16.8% (11.4–22.2)

NOTE: All data are weighted.

Table 3.14
Marital Status by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Married	24.2% (22.4–26.0)	58.3% (56.5–60.2)	76.6% (75.0–78.2)	75.6% (70.4–80.7)	59.4% (56.0–62.7)	81.2% (79.6–82.8)
Cohabiting	16.8% (15.0–18.6)	13.2% (11.9–14.6)	6.4% (5.4–7.3)	9.0% (5.3–12.6)	8.7% (6.7–10.6)	4.2% (3.3–5.0)
Separated, divorced, or widowed	4.3% (3.5–5.1)	10.2% (9.2–11.3)	11.6% (10.4–12.8)	9.4% (6.2–12.6)	6.3% (4.8–7.7)	8.1% (7.0–9.3)
Never married	54.7% (52.4–57.0)	18.2% (16.7–19.7)	5.4% (4.5–6.3)	6.1% (3.0–9.1)	25.7% (22.5–29.0)	6.5% (5.5–7.5)

NOTE: All data are weighted.

Table 3.15
Marital Status by Gender, Weighted Respondent Sample

	Men	Women
Married	51.2% (49.7–52.6)	35.6% (33.9–37.2)
Cohabiting	12.0% (11.0–13.1)	16.3% (14.8–17.7)
Separated, divorced, or widowed	6.2% (5.7–6.8)	12.0% (11.0–13.1)
Never married	30.5% (29.1–32.0)	36.1% (34.1–38.1)

NOTE: All data are weighted.

Parental (or Dependent) Status

Whether a respondent was a parent, defined here as whether the service member had a DoD-defined dependent under the age of 18, was derived from DMDC personnel data—specifically, the Defense Enrollment Eligibility Reporting System (DEERS) file. Table 3.16 presents the percentage of respondents who had a dependent in the DoD record system by service branch, Table 3.17 presents results by pay grade, and Table 3.18 presents results by gender. Key findings include the following:

- At least half of service members in the Air Force Reserve, Air Force Air Guard, Navy Reserve, and Coast Guard Reserve were parents (using our definition). The Marine Corps Reserve had the fewest members who were responsible for at least one dependent.
- Age and having a dependent were positively correlated, with more older than younger service members having at least one DoD dependent (Table 3.17).
- A larger percentage of men than women had at least one DoD dependent (Table 3.18).

Table 3.16
Dependent Status by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Dependent in household	51.5% (48.8–54.3)	52.3% (50.2–54.5)	41.3% (39.1–43.5)	41.6% (39.7–43.6)	23.8% (19.5–28.2)	50.5% (46.8–54.3)	53.8% (46.5–61.0)

NOTE: All data are weighted.

Table 3.17
Dependent Status by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Dependent in household	17.4% (15.9–19.0)	55.4% (53.6–57.3)	83.7% (82.3–85.1)	75.7% (70.0–81.4)	43.3% (40.1–46.4)	79.5% (77.8–81.2)

NOTE: All data are weighted.

Table 3.18
Dependent Status by Gender, Weighted Respondent Sample

	Men	Women
Dependent in household	44.9% (43.6–46.3)	38.9% (37.2–40.7)

NOTE: All data are weighted.

Housing Status

One item asked service members to indicate where they lived at the time of the survey, including both on-installation and off-installation options. Table 3.19 (by service branch), Table 3.20 (by pay grade), and Table 3.21 (by gender) show the percentage of service members living outside a military installation (including privatized military housing, personally mortgaged housing, and rental housing), on an installation in dorms or barracks, in other housing on an installation (including privatized military housing), and in some other housing situation (including with parents or in temporary housing). Key findings include the following:

- The majority of all reserve component service members lived in off-installation housing (Table 3.19).
- More junior enlisted personnel lived on installations, especially in dorms or barracks, than more-senior enlisted personnel or officers (Table 3.20).
- Both men and women were more likely to live off versus on an installation (Table 3.21).

Table 3.19
Housing Status by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Off-installation housing	86.5% (84.3–88.6)	87.9% (86.4–89.5)	74.4% (72.0–76.9)	74.5% (72.3–76.6)	61.8% (55.8–67.9)	82.2% (78.1–86.2)	94.2% (90.9–97.5)
Dorms or barracks on an installation	1.1% (0.0–2.3)	1.2% (0.6–1.8)	3.9% (2.7–5.2)	3.5% (2.6–4.4)	5.6% (2.8–8.4)	4.4% (2.5–6.2)	0.1% (0.0–0.2)
Other on-installation housing	2.1% (1.4–2.7)	1.7% (1.1–2.2)	3.7% (3.0–4.5)	1.2% (0.8–1.5)	3.3% (1.5–5.1)	2.5% (1.6–3.4)	1.4% (0.0–3.1)
Other housing situation	10.3% (8.5–12.2)	9.2% (7.8–10.6)	17.9% (15.6–20.2)	20.8% (18.8–22.9)	29.3% (23.5–35.1)	11.0% (7.2–14.8)	4.3% (1.4–7.2)

NOTE: All data are weighted.

Table 3.20
Housing Status by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Off-installation housing	58.2% (55.9–60.5)	89.9% (88.7–91.0)	94.2% (93.3–95.0)	93.2% (90.1–96.3)	89.1% (86.6–91.5)	94.3% (93.4–95.3)
Dorms or barracks on an installation	5.4% (4.2–6.5)	1.9% (1.4–2.4)	1.4% (0.9–1.8)	2.3% (0.5–4.1)	1.9% (1.1–2.7)	1.0% (0.6–1.5)
Other on-installation housing	1.2% (0.8–1.6)	2.4% (1.8–2.9)	3.0% (2.4–3.6)	3.5% (1.1–5.9)	3.3% (2.1–4.5)	3.3% (2.6–4.0)
Other housing situation	35.2% (32.9–37.5)	5.8% (4.9–6.8)	1.4% (1.0–1.9)	1.0% (0.0–2.1)	5.7% (3.6–7.8)	1.3% (0.8–1.8)

NOTE: All data are weighted.

Table 3.21
Housing Status by Gender, Weighted Respondent Sample

	Men	Women
Off-installation housing	77.9% (76.5–79.3)	75.1% (73.0–77.1)
Dorms or barracks on an installation	3.2% (2.6–3.8)	3.4% (2.7–4.2)
Other on-installation housing	1.9% (1.6–2.2)	2.9% (2.4–3.5)
Other housing situation	17.0% (15.6–18.3)	18.6% (16.6–20.5)

NOTE: All data are weighted.

Employment Status

Finally, two survey items assess reserve component member's current employment status. Table 3.22 (by service branch), Table 3.23 (by pay grade), and Table 3.24 (by gender) show the percentage of service members who, at the time of the survey, were employed full time (35 or more hours per week); employed part time (less than 35 hours per week); a full-time homemaker, parent, or student; retired, disabled, or other; unemployed and looking for work; and unemployed and not looking for work (i.e., out of the labor force). Key findings include the following:

- The majority, roughly 80 percent, of reserve component service members were working full time; another 12 percent worked part time. The unemployment rate (i.e., those not working but looking for a job) was roughly 3 percent. The unemployment rate during the survey administration period for the U.S. adult population ranged from 3.7 percent (November 2018) to 4.0 percent (January 2019) (U.S. Bureau of Labor Statistics, 2019).
- A larger percentage of junior enlisted and officers worked part time compared with senior enlisted personnel and officers, who were more likely to be employed full time.
- A larger percentage of women versus men worked part-time or were full-time homemakers, parents, or students.

Table 3.22
Employment Status by Service Branch, Weighted Respondent Sample

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve
Employed full time	82.4% (80.0–84.8)	89.4% (88.0–90.8)	74.8% (72.4–77.2)	76.9% (74.9–79.0)	69.9% (63.8–76.0)	82.7% (78.9–86.6)	84.8% (79.7–89.9)
Employed part time	9.8% (8.2–11.5)	7.3% (6.1–8.6)	13.8% (11.8–15.8)	13.5% (11.8–15.2)	15.6% (11.2–19.9)	8.4% (5.4–11.3)	10.5% (5.9–15.1)
Full-time homemaker, parent, or student	3.9% (2.8–5.1)	1.4% (0.9–1.9)	5.0% (3.6–6.3)	4.1% (3.2–5.0)	7.0% (3.6–10.3)	4.0% (2.5–5.4)	3.6% (1.4–5.9)
Retired, disabled, or other	2.1% (0.5–3.6)	1.0% (0.4–1.5)	2.2% (1.6–2.8)	1.7% (1.1–2.3)	3.5% (0.9–6.1)	3.1% (0.4–5.9)	0.2% (0.0–0.6)
Unemployed, looking for work	1.8% (1.0–2.6)	0.9% (0.5–1.3)	4.3% (3.2–5.4)	3.8% (2.9–4.8)	4.1% (0.01–8.2)	1.8% (1.1–2.6)	0.9% (0.0–2.1)
Unemployed, out of labor force	0.5% (0.04–0.9)	0.1% (0.0–0.3)	0.3% (0.1–0.6)	0.1% (0.0–0.3)	1.3% (0.0–2.9)	0.5% (0.0–1.2)	0.0% (0.0–1.6)

NOTE: All data are weighted.

Table 3.23
Employment Status by Pay Grade, Weighted Respondent Sample

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Employed full time	63.1% (60.8–65.4)	87.6% (86.3–88.8)	95.0% (94.1–95.8)	97.2% (95.5–98.9)	88.3% (86.2–90.4)	92.6% (91.5–93.6)
Employed part time	22.0% (20.0–24.0)	5.6% (4.7–6.5)	2.3% (1.7–2.9)	0.6% (0.0–1.1)	7.5% (5.8–9.2)	5.0% (4.1–5.8)
Full-time homemaker, parent, or student	6.6% (5.4–7.7)	3.6% (2.8–4.4)	0.5% (0.2–0.8)	0.0% (0.0–1.1)	1.2% (0.6–1.8)	0.6% (0.3–0.9)
Retired, disabled, or other	2.5% (1.6–3.3)	1.0% (0.6–1.4)	1.3% (0.9–1.7)	1.4% (0.3–2.4)	0.7% (0.2–1.1)	0.8% (0.5–1.2)
Unemployed, looking for work	5.5% (4.3–6.6)	2.0% (1.5–2.5)	0.8% (0.4–1.2)	0.9% (0.0–2.1)	1.9% (0.8–2.9)	1.0% (0.6–1.4)
Unemployed, out of labor force	0.4% (0.1–0.7)	0.3% (0.1–0.5)	0.1% (0.0–0.2)	0.0% (0.0–1.1)	0.5% (0.0–1.1)	0.0% (0.0–0.1)

NOTE: All data are weighted.

Table 3.24
Employment Status by Gender, Weighted Respondent Sample

	Men	Women
Full time	80.4% (79.0–81.7)	72.1% (70.0–74.1)
Part time	10.9% (9.9–12.0)	16.9% (15.0–18.8)
Full-time homemaker, parent, or student	3.7% (3.1–4.3)	5.4% (4.5–6.4)
Retired, disabled, or other	1.7% (1.2–2.1)	1.4% (0.9–1.8)
Unemployed, looking for work	3.0% (2.4–3.6)	4.1% (3.2–4.9)
Unemployed, out of labor force	0.3% (0.2–0.5)	0.2% (0.02–0.3)

NOTE: All data are weighted.

Overall Sample Description

Below we examine the overall sample by the demographic characteristics explored above (Table 3.25). In the first column, we present the results based on only the two Guard components: the Air Force Air Guard and the Army National Guard. The second column includes data on the five reserve components: Air Force Reserve, Army Reserve, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve. The final column includes all seven components of the reserve.

Summary

Use of poststratification weights ensured that the 2018 HRBS weighted respondent sample matched the three factors that were included in the sampling design: service branch, pay grade, and gender. The Army Reserve and Army National Guard were the largest branches represented in the weighted sample, whereas the Coast Guard Reserve was the smallest service. Junior and midgrade enlisted service members outnumbered their more-senior enlisted colleagues, as well as junior, midgrade, and warrant officers. Almost five times as many men as women served in the reserve component. The average HRBS respondent was somewhere between the ages of 25 and 35, non-Hispanic white, married with no DoD dependent, lived off an installation, had at least a high school degree, and worked full time or part time.

Table 3.25
Overall Weighted Sample Description

	2018 HRBS Weighted Reserve Total[a]	2018 HRBS National Guard Total[b]	2018 HRBS Weighted Reserve Component Total[c]
Age group			
Ages 17–24	24.5% (22.7–26.3)	29.5% (27.7–31.4)	27.2% (26.0–28.5)
Ages 25–34	37.3% (35.7–38.9)	37.0% (35.3–38.6)	37.1% (35.9–38.3)
Ages 35–44	23.9% (22.8–25.0)	21.0% (20.0–22.1)	22.3% (21.6–23.1)
Ages 45+	14.4% (13.7–15.1)	12.5% (11.8–13.1)	13.3% (12.9–13.8)
Racial/ethnic group			
Non-Hispanic white	55.8% (54.1–57.4)	70.6% (69.1–72.2)	63.9% (62.8–65.0)
Non-Hispanic black	18.8% (17.4–20.1)	13.2% (12.0–14.5)	15.7% (14.8–16.6)
Hispanic	15.7% (14.5–16.8)	10.7% (9.6–11.7)	12.9% (12.1–13.7)
Non-Hispanic Asian	7.0% (6.2–7.8)	3.5% (3.0–4.0)	5.1% (4.6–5.6)
Other	2.8% (2.3–3.3)	2.0% (1.5–2.4)	2.3% (2.0–2.7)

Table 3.25—continued

	2018 HRBS Weighted Reserve Total[a]	2018 HRBS National Guard Total[b]	2018 HRBS Weighted Reserve Component Total[c]
Education			
High school or less	59.1% (57.7–60.6)	46.3% (44.5–48.0)	52.1% (50.9–53.2)
Some college	13.0% (12.1–13.9)	31.6% (30.2–33.0)	23.2% (22.3–24.1)
Bachelor's degree or more	27.9% (26.7–29.0)	22.1% (21.0–23.2)	24.7% (23.9–25.5)
Marital status			
Married	49.0% (47.4–50.6)	47.2% (45.5–48.8)	48.0% (46.8–49.2)
Cohabiting	11.1% (10.0–12.2)	14.4% (13.1–15.7)	12.9% (12.0–13.8)
Separated, divorced, or widowed	8.2% (7.4–9.0)	6.8% (6.1–7.5)	7.4% (6.9–7.9)
Never married	31.7% (30.0–33.5)	31.6% (29.9–33.4)	31.7% (30.4–32.9)
Parent (has DoD dependent)	43.1% (41.6–44.6)	44.2% (42.6–45.8)	43.7% (42.6–44.8)
Housing status			
Off-installation housing	77.0% (75.3–78.6)	77.7% (76.0–79.4)	77.3% (76.2–78.5)
Dorms or barracks on an installation	3.6% (2.8–4.4)	3.0% (2.3–3.7)	3.2% (2.7–3.8)
Other on-installation housing	3.1% (2.6–3.6)	1.3% (1.0–1.6)	2.1% (1.8–2.4)
Other housing situation	16.3% (14.8–17.9)	18.1% (16.4–19.7)	17.3% (16.2–18.4)
Employment status			
Employed full-time	77.2% (75.5–78.8)	79.9% (78.3–81.5)	78.7% (77.5–79.8)
Employed part-time	12.3% (11.0–13.6)	12.0% (10.7–13.4)	12.1% (11.2–13.1)
Full-time homemaker, parent, or student	4.8% (3.9–5.6)	3.4% (2.7–4.1)	4.1% (3.5–4.6)
Retired, disabled, or other	2.4% (1.7–3.1)	1.5% (1.0–2.0)	1.9% (1.5–2.3)
Unemployed, looking for work	3.3% (2.6–4.1)	3.1% (2.4–3.9)	3.2% (2.7–3.8)
Unemployed, out of labor force	0.5% (0.2–0.7)	0.1% (0.0–0.3)	0.3% (0.2–0.4)

NOTE: All data are weighted.

[a] Includes Air Force Reserve, Army Reserve, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve.

[b] Includes only Air Force Air Guard and Army National Guard.

[c] Includes both Air Force Reserve, Air Force Air Guard, Army Reserve, Army National Guard, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve.

CHAPTER FOUR

Health Promotion and Disease Prevention

This chapter presents analyses of several health promotion and disease prevention indicators among reserve component service members. Specifically, we examined self-reported service member weight, physical activity, insurance status, and sleep health as well as use of electronic devices (or screen time), routine medical care, energy supplements, and sleep aids. We also compared reserve component service members with the HP2020 objectives, a set of national health objectives designed by HHS to improve the health of the U.S. population. Individuals are only permitted to join the military if they meet certain physical requirements. This means that the military population is likely to be quite different from the general population with regard to many health-related factors, such as obesity and physical activity. This limits the applicability of the HP2020 guidelines in the area of health promotion.

We provide analysis of each topic by service branch, pay grade, and gender. Further analysis by race/ethnicity and age group can be found in Appendix D. Key measures are described in the corresponding section. Additional detail on these measures can be found in Appendix C. Analyses show statistically significant omnibus tests (a Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless noted in the tables. Statistically significant pairwise comparisons are also presented with the tables. Statistically significant differences that the research team's subject-matter experts deemed important—meaning that the results could be used to change or develop policy or contribute to important inequalities in health outcomes across subgroups—are discussed in the text.

At the end of the chapter, we present comparisons between the active and reserve components on the key outcomes presented in this chapter. These comparative results use ARRs based on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARRs can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20 percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matters for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind what is the base for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 per-

cent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Weight Status

Nearly 40 percent of the general U.S. population is classified as obese by the Centers for Disease Control and Prevention (CDC), and over 70 percent is classified as obese or overweight (National Center for Health Statistics, 2018a). This is significant because obesity is a risk factor for early mortality and many chronic diseases, such as cardiovascular disease, diabetes, and cancer (Lauby-Secretan et al., 2016; Guh et al., 2009; Aune et al., 2016).

For the military, weight status is an important threat to readiness: service members who are overweight or obese might be unable to function due to related comorbidities, such as diabetes, asthma, hypertension, or persistent musculoskeletal injuries. Furthermore, all service members, including those in the reserve component, must meet the DoDI 1308.3 standards to deploy (DoD, 2002). These standards include weight requirements, and, to deploy in violation of the these standards, a waiver is required, slowing the process of deployment (Copp, 2018b). Indeed, waiver-related delays have become so problematic militarywide as to prompt consideration of revisions to DoDI 1308.3 (Copp, 2018b; Watson, 2016; Department of Defense Office of the Assistant Secretary for Health Affairs, 2018).

Body mass index (BMI) was used in the 2018 HRBS to define weight status categories. BMI was calculated from service member reported height and weight. We calculated BMI according to the standard CDC formula: weight (in kilograms [kg]) divided by height (in meters squared [m^2]) (National Center for Health Statistics, 2018a). The CDC criteria were used to categorize the resulting BMI as follows:

- underweight (BMI less than 18.5 kg/m^2)
- normal weight (BMI 18.5–24.9 kg/m^2)
- overweight (BMI 25.0–29.9 kg/m^2)
- obese (BMI 30 or more kg/m^2).

For service members younger than age 20, we used age- and sex-specific definitions set by the CDC (National Center for Health Statistics, 2018a). BMI offers an accessible survey-based estimate of body fat, but research suggests that BMI might yield false positive obesity findings among some service members and could overestimate the proportion with this problem (Heinrich et al., 2008).

Weight status results are presented in Tables 4.1 through 4.3. Key findings include the following:

- Overall, among service members 20 years of age or older, 31.4 percent (95-percent CI: 30.2–32.5) met guidelines for normal weight. This is compared with just 27.7 percent of the general population. The HP2020 goal is for at least 33.9 percent of the U.S. population to be classified as normal weight (Healthy People, 2020j).
- Among 2018 HRBS respondents age 20 and older, 19.0 percent (95-percent CI: 18.1–20.0) were classified as obese. The HP2020 goal for obesity in the general population is 30.5 percent or less (Healthy People, 2020k), and among the general population 31.4 per-

Table 4.1
Weight Status, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
HP2020										
Obesity among those age 20+ (HP2020 target: <30.5 percent)	13.7%[c,d,f] (11.9–15.5)	16.4%[c,d,e] (14.8–17.9)	20.1%[a,b,e] (18.2–22.0)	21.8%[a,b,e] (20.0–23.6)	7.4%[b,c,d,f] (3.8–11.0)	19.8%[a,e] (17.1–22.5)	13.6% (9.0–18.1)	17.4% (16.2–18.6)	20.4% (19.0–21.8)	19.0% (18.1–20.0)
Normal weight among those age 20+ (HP2020 target: >33.9 percent)	34.2% (31.6–36.7)	31.0% (28.9–33.0)	32.6% (30.3–34.9)	29.5%[e] (27.5–31.5)	40.1%[d,f] (33.8–46.4)	29.4%[e] (25.8–33.0)	29.3% (22.2–36.5)	33.1% (31.5–34.7)	29.9% (28.3–31.5)	31.4% (30.2–32.5)
Weight categories										
Underweight[z]	0.4% (0.2–0.7)	0.4% (0.1–0.7)	0.7% (0.3–1.2)	0.6% (0.2–1.0)	1.0% (0.0–2.6)	0.2% (0.01–0.5)	0.4% (0.0–1.0)	0.6% (0.3–0.9)	0.5% (0.2–0.8)	0.6% (0.4–0.8)
Normal weight	35.1% (32.5–37.7)	32.5%[e] (30.5–34.6)	36.1% (33.7–38.5)	33.1%[e] (31.0–35.1)	42.9%[b,d,f] (36.7–49.0)	29.4%[e] (25.8–33.0)	29.5% (22.4–36.7)	35.4% (33.8–37.1)	32.9% (31.3–34.6)	34.1% (32.9–35.2)
Overweight	51.1%[c,d] (48.3–53.9)	51.1%[c,d] (49.0–53.3)	44.4%[a,b,g] (42.1–46.8)	45.7%[a,b] (43.6–47.8)	48.8% (42.7–54.9)	50.9% (47.1–54.6)	56.5%[c] (49.3–63.7)	47.4% (45.8–49.0)	47.0% (45.3–48.7)	47.2% (46.0–48.4)
Obese	13.3%[c,d,f] (11.6–15.1)	15.9%[d,e] (14.4–17.5)	18.7%[a,e] (16.9–20.5)	20.6%[a,b,e] (18.9–22.3)	7.3%[b,c,d,f] (3.8–10.7)	19.4%[a,e] (16.8–22.1)	13.5% (9.0–18.0)	16.5% (15.4–17.7)	19.5% (18.2–20.9)	18.2% (17.3–19.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.2
Weight Status, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
HP2020						
Obesity among those age 20+ (HP2020 target: <30.5 percent)	15.5%[b,c] (13.5–17.4)	22.7%[a,c,e,f] (21.1–24.2)	26.3%[a,b,d,e,f] (24.6–27.9)	17.1%[c] (12.9–21.3)	14.0%[b,c] (11.8–16.2)	16.9%[b,c] (15.3–18.5)
Normal weight among those age 20+ (HP2020 target: >33.9 percent)	41.3%[b,c,d,e,f] (38.9–43.7)	25.8%[a,c,e] (24.2–27.4)	17.3%[a,b,d,e,f] (15.9–18.7)	25.4%[a,c] (19.8–31.0)	32.9%[a,b,c,f] (29.9–36.0)	25.7%[a,c,e] (23.9–27.4)
Weight categories						
Underweight	0.9%[c] (0.4–1.3)	0.4% (0.2–0.7)	0.2%[a] (0.1–0.4)	0.3% (0.0–1.0)	0.5% (0.0–1.0)	0.2% (0.01–0.4)
Normal weight	46.3%[b,c,d,e,f] (44.0–48.6)	25.9%[a,c,e] (24.3–27.5)	17.3%[a,b,d,e,f] (15.9–18.7)	25.4%[a,c] (19.8–31.0)	32.9%[a,b,c,f] (29.9–36.0)	25.7%[a,c,e] (23.9–27.4)
Overweight	39.0%[b,c,d,e,f] (36.7–41.2)	51.0%[a,c,f] (49.2–52.8)	56.2%[a,b] (54.4–58.1)	57.2%[a] (51.3–63.1)	52.6%[a] (49.3–55.9)	57.3%[a,b] (55.2–59.3)
Obese	13.9%[b,c] (12.1–15.6)	22.6%[a,c,e,f] (21.1–24.1)	26.3%[a,b,d,e,f] (24.6–27.9)	17.1%[c] (12.9–21.3)	14.0%[b,c] (11.8–16.2)	16.9%[b,c] (15.3–18.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

cent were classified as obese (National Center for Health Statistics, 2018b), which means that the reserve component is doing better than both the HP2020 standards and the U.S. population percentage (Table 4.1).

- Among service members age 20 or older, a statistically significantly larger percentage of junior enlisted service members (E1–E4) were classified as normal weight by the HP2020 standards as compared with all other ranks (41.3 percent, 95-percent CI: 38.9–43.7; Table 4.2). A significantly larger percentage of senior enlisted service members (E7–E9) were classified as obese compared with all other ranks (26.3 percent, 95-percent CI: 24.6–27.9; Table 4.2).
- A significantly smaller portion of female service members age 20 or older were obese (12.2 percent, 95-percent CI: 11.0–13.5) compared with their male counterparts (20.7 percent, 95-percent CI: 19.6–21.9; Table 4.3). This is inconsistent with the general population, where a greater proportion of women is obese (40.5 percent of women versus 36.5 percent of men; National Center for Health Statistics, 2018b).
- A statistically significantly greater portion of service members ages 17–24 were classified as normal weight as compared with all other age groups (54.1 percent, 95-percent CI: 51.0–57.1). Further detail on age differences can be found in Appendix Table D.2.

Table 4.3
Weight Status, by Gender

	Men	Women
HP2020		
Obesity among those age 20+ (HP2020 target: <30.5 percent)	20.7%[a] (19.6–21.9)	12.2% (11.0–13.5)
Normal weight among those age 20+ (HP2020 target: >33.9 percent)	27.0%[a] (25.7–28.3)	49.1% (47.3–51.0)
Weight categories		
Underweight[z]	0.6% (0.3–0.8)	0.7% (0.4–0.9)
Normal weight	29.4%[a] (28.0–30.7)	52.3% (50.4–54.3)
Overweight	50.1%[a] (48.7–51.5)	35.7% (33.9–37.5)
Obese	19.9%[a] (18.8–21.0)	11.3% (10.1–12.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Physical Activity

A large majority of the U.S. population—75.6 percent—currently is not meeting the HP2020 goals for physical fitness (National Center for Health Statistics, 2018a). These goals include both aerobic and muscle strengthening activities. Engaging in regular physical activity has been shown to prevent chronic diseases (such as cardiovascular disease, osteoarthritis, and cancer) and depression and to improve sleep and sense of well-being (Warburton, Nicol, and Bredin, 2006). The HP2020 goal for medium physical activity is 47.9 percent or more of the general U.S. population engaging in 150 minutes or more a week of moderate physical activity (MPA) or 75 minutes or more of vigorous physical activity (VPA; National Center for Health Statistics, 2018a). The HP2020 goal for high physical activity is that 31.3 percent or more of the U.S. general population engages in 300 minutes or more of MPA a week or 150 minutes or more of VPA.

The military has fitness standards that are aimed at encouraging physical fitness and body fat standards, including aerobic capacity, muscular strength, muscular endurance, and body fat composition, because physical fitness is essential for a ready force (Army Public Health Center, 2015). The standards for physical fitness do not differ between the active component and the reserve component (see Department of Defense Directive 1308.1, 2004). Poor physical fitness is associated with injuries and chronic conditions that can adversely impact military readiness (Knapik, 2015; Knapik et al., 2001). These conditions can make it difficult to support physically demanding missions and make it impossible for service members to deploy to remote

locations without medical support (Army Public Health Center, 2015). Good physical fitness has also been associated with mental resilience and physical endurance, which are important force readiness characteristics (Crowley et al., 2015; Silverman and Deuster, 2014). Physical fitness has also been associated with lower levels of PTSD in one study that included both reserve and active-duty service members (LeardMann et al., 2011) and with better cardiovascular health in another study that included predeployment Army National Guard soldiers (Talbot, Weinstein, and Fleg, 2009). In the following section, we describe service member reported physical fitness levels. Reserve component service members were asked to estimate minutes spent in exercise each week and their frequency of strength training. For each measure, we describe level of physical training overall and by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Where available, we report on comparable percentages from the U.S. general population.

Moderate and Vigorous Physical Activity

Tables 4.4 through 4.6 present the percentages of service members who engaged in moderate and vigorous aerobic physical activity weekly, broken down by time engaged in those activities. MPA in our survey was defined as exertion "that raises heart rate and breathing, but you should be able to carry on a conversation comfortably during the activity" (see Appendix A). VPA in our survey was defined as exertion that is "high enough that you would find it difficult to carry on a conversation during the activity." Both of these measures were altered from the National Health and Nutrition Examination Survey (NHANES; National Center for Health Statistics, 2016).

Key findings include the following:

- There are two HP2020 goals associated with physical activity. The first, for medium levels of physical activity, is for at least 47.9 percent of the adult U.S. population to get 150 or more minutes of MPA or 75 minutes or more of VPA per week (Healthy People, 2020l). Among 2018 HRBS reserve component respondents, 67.2 percent reported this level of physical activity (95-percent CI: 66.1–68.3). Among the general population, 53.3 percent reported meeting the HP2020 standard (CDC, 2018a). Further detail can be found in Table 4.4.
- The second HP2020 goal, for high levels of physical activity, is for at least 31.3 percent of the adult U.S. general population to get 300 minutes or more of MPA or 150 minutes or more of VPA per week (Healthy People, 2020m). Among 2018 HRBS reserve component respondents, 41.6 percent reported meeting this level of activity (95-percent CI: 40.4–42.8). This is compared with 37 percent of the general population (National Center for Health Statistics, 2018a). Further detail can be found in Table 4.4.
- Across all pay grades (Table 4.5), a statistically significantly larger percentage of junior enlisted service members (E1–E4) engaged in 300 minutes or more of MPA each week compared with E5–E9 and officers (except warrant officers) (25.8 percent, 95-percent CI: 23.7–27.8).
- A statistically significantly larger percentage of men reported that they engaged in 300 minutes or more of MPA, as compared with women (23.3 percent, 95-percent CI: 22.1–24.6, versus 17.4 percent, 95-percent CI: 15.9–18.9; Table 4.6). This is consistent with trends in the general population (CDC, 2018a).
- Overall, 39.8 percent (95-percent CI: 38.6–40.9) of service members reported that they engaged in less than 150 minutes per week of MPA, 38.1 percent in 150–299 minutes

Table 4.4
Physical Activity Past 30 Days, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
HP2020										
Medium physical activity level (150 mins MPA or 75 mins VPA; HP2020 target: ≥47.9 percent)	67.3% (64.7–69.8)	66.8% (64.7–68.8)	67.4% (65.2–69.7)	67.8%[f] (65.9–69.8)	71.7%[f] (66.3–77.1)	60.9%[d,e] (57.0–64.7)	64.6% (57.3–71.9)	66.7% (65.2–68.3)	67.6% (66.0–69.1)	67.2% (66.1–68.3)
High physical activity level (300 mins MPA or 150 mins VPA; HP2020 target: ≥31.3 percent)	40.9%[e] (38.1–43.7)	41.6%[f] (39.5–43.8)	40.9%[e,f] (38.5–43.2)	42.4%[f] (40.3–44.5)	51.3%[a,c,f] (45.2–57.4)	34.4%[b,c,d,e] (30.9–37.8)	38.5% (31.8–45.2)	40.9% (39.3–42.5)	42.2% (40.5–43.9)	41.6% (40.4–42.8)
MPA										
<150 mins/week[x]	41.1% (38.4–43.8)	41.3% (39.2–43.4)	39.7% (37.4–42.1)	38.5% (36.5–40.5)	37.0% (31.2–42.8)	44.6% (40.8–48.4)	42.6% (35.4–49.8)	40.5% (38.9–42.1)	39.2% (37.5–40.8)	39.8% (38.6–40.9)
150–299 mins/week[z]	39.2% (36.5–41.9)	39.2% (37.1–41.2)	39.9% (37.5–42.3)	36.9% (34.9–39.0)	33.2% (27.3–39.0)	39.4% (35.8–43.0)	33.9% (27.4–40.4)	38.9% (37.3–40.5)	37.5% (35.8–39.1)	38.1% (37.0–39.3)
300+ mins/week	19.7%[d,e] (17.2–22.2)	19.5%[d,e] (17.7–21.3)	20.4%[d,e] (18.5–22.3)	24.6%[a,b,c,f] (22.7–26.5)	29.8%[a,b,c,f] (24.2–35.4)	16.0%[d,e] (13.5–18.5)	23.4% (17.8–29.1)	20.6% (19.3–21.9)	23.4% (21.9–24.9)	22.1% (21.1–23.2)
VPA										
<75 mins/week	56.7%[f] (54.0–59.5)	56.0%[f] (53.9–58.2)	58.2%[f] (55.8–60.6)	57.8%[f] (55.7–59.9)	49.4%[f,g] (43.3–55.5)	66.2%[a,b,c,d,e] (62.9–69.6)	65.6%[e] (59.2–72.0)	58.4% (56.8–60.0)	57.4% (55.7–59.1)	57.9% (56.7–59.0)
75–149 mins/week[z]	9.2% (7.7–10.8)	8.7% (7.5–9.9)	8.0% (6.7–9.2)	7.9% (6.8–9.0)	10.3% (5.5–15.0)	6.0% (4.7–7.4)	8.3% (4.7–11.9)	8.1% (7.2–9.0)	8.1% (7.2–9.0)	8.1% (7.5–8.8)
150+ mins/week	34.0% (31.3–36.7)	35.3%[f] (33.2–37.3)	33.9%[f] (31.5–36.2)	34.2%[f] (32.2–36.3)	40.4%[f,g] (34.4–46.3)	27.7%[b,c,d,e] (24.5–30.9)	26.1%[e] (20.4–31.8)	33.4% (31.9–35.0)	34.5% (32.9–36.1)	34.0% (32.9–35.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.5
Physical Activity Past 30 Days, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
HP2020						
Medium physical activity level (150 mins MPA or 75 mins VPA; HP2020 target: ≥47.9 percent)	68.1%[c] (65.9–70.2)	66.6% (64.9–68.3)	63.7%[a,e] (61.9–65.5)	62.7% (56.8–68.6)	70.5%[c] (67.6–73.5)	67.3% (65.3–69.2)
High physical activity level (300 mins MPA or 150 mins VPA; HP2020 target: ≥31.3 percent)	43.9%[c,f] (41.5–46.2)	41.4%[c] (39.6–43.2)	36.1%[a,b] (34.3–37.9)	40.1% (34.4–45.8)	40.4% (37.3–43.6)	39.3%[a] (37.3–41.4)
MPA						
<150 mins/week	37.6%[c,d,f] (35.4–39.8)	40.0%[c,f] (38.3–41.8)	44.0%[a,b,e] (42.2–45.9)	48.3%[a,e] (42.4–54.2)	38.2%[c,d,f] (35.0–41.3)	44.7%[a,b,e] (42.6–46.8)
150–299 mins/week[x]	36.6% (34.4–38.9)	38.6% (36.9–40.4)	40.5% (38.6–42.3)	33.1% (27.7–38.5)	41.7% (38.4–45.0)	38.0% (36.0–40.0)
300+ mins/week	25.8%[b,c,e,f] (23.7–27.8)	21.3%[a,c,f] (19.7–22.9)	15.5%[a,b,e] (14.1–16.9)	18.6% (14.4–22.8)	20.1%[a,c] (17.5–22.7)	17.3%[a,b] (15.7–18.9)
VPA						
<75 mins/week	57.7% (55.4–60.0)	57.5%[c] (55.6–59.3)	61.9%[b,e,f] (60.0–63.7)	57.3% (51.5–63.1)	55.6%[c] (52.4–58.8)	56.8%[c] (54.7–58.8)
75–149 mins/week[x]	7.2% (6.0–8.4)	8.9% (7.9–10.0)	7.5% (6.5–8.5)	8.7% (5.6–11.8)	9.4% (7.5–11.3)	9.7% (8.5–11.0)
150+ mins/week[z]	35.1% (32.9–37.4)	33.6% (31.9–35.4)	30.6% (28.8–32.4)	34.0% (28.4–39.5)	35.0% (32.0–38.0)	33.5% (31.5–35.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

(95-percent CI: 37.0–39.3), and 22.1 percent in 300 minutes or more (95-percent CI: 21.1–23.2) per week (Table 4.4).

- As shown in Tables 4.4 through 4.6, across all categories, time engaged in VPA largely fell into either the lower reported vigorous activity category (less than 75 minutes per week) or the highest reported vigorous activity category (more than 150 minutes per week). Just 8.1 percent of respondents reported vigorous activity levels in the middle category (95-percent CI: 7.5–8.8) (75–149 minutes).
- Table 4.6 shows that men were significantly more likely to report engaging in VPA than women.

Table 4.6
Physical Activity Past 30 Days, by Gender

	Men	Women
HP2020		
Medium physical activity level (150 mins MPA or 75 mins VPA; HP2020 target: ≥47.9 percent)	68.9%[a] (67.7–70.2)	60.4% (58.5–62.4)
High physical activity level (300 mins MPA or 150 mins VPA; HP2020 target: ≥31.3 percent)	43.7%[a] (42.3–45.1)	33.4% (31.6–35.1)
MPA		
<150 mins/week	38.2%[a] (36.9–39.6)	45.8% (43.9–47.7)
150–299 mins/week[z]	38.4% (37.1–39.8)	36.8% (35.0–38.6)
300+ mins/week	23.3%[a] (22.1–24.6)	17.4% (15.9–18.9)
VPA		
<75 mins/week	55.6%[a] (54.2–57.0)	66.6% (64.9–68.4)
75–149 mins/week[z]	8.3% (7.6–9.1)	7.4% (6.4–8.4)
150+ mins/week	36.1%[a] (34.7–37.4)	26.0% (24.4–27.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Strength Training

Tables 4.7 through 4.9 present the findings for the number of times per week a service member engaged in strength training over the past 30 days. *Strength training* is defined in our survey as "including using weights or resistance training to increase muscle strength" (see Appendix A). This was also modified from the NHANES instrument (National Center for Health Statistics, 2016). Key findings include the following:

- The HP2020 goal for strength training is for at least 24.1 percent of Americans to engage in muscle-strengthening exercises two or more days a week (Healthy People, 2020n). Just over one quarter (27.8 percent) of the general population reported meeting this goal in 2017 (CDC, 2018a). Roughly 43 percent of reserve component service members reported engaging in three or more days a week of muscle-strengthening activities in the 2018 HRBS (43.1 percent; 95-percent CI: 41.9–44.3). Because the HRBS response options do not allow us to directly compare with the HP2020 goal of two or more days per week, we are likely underestimating the percentage of service members meeting the HP2020 goal (Table 4.7).
- Almost one-third (30.9 percent) of reserve component respondents reported in engaging in less than one day a week of strength training (95-percent CI: 29.8–32.0), and just over

Table 4.7
Past-30-Day Strength Training, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
HP2020										
Muscle-strengthening activities on 3+ days/week (HP2020 target [2+ days/week]: 24.1%)[q]	44.7%[f] (41.9–47.5)	42.5%[f] (40.4–44.7)	43.3%[f] (40.9–45.7)	43.4%[f] (41.3–45.5)	51.3%[f] (45.2–57.4)	35.3%[a,b,c,d,e] (31.8–38.8)	38.0% (31.3–44.7)	43.0% (41.4–44.7)	43.2% (41.5–44.9)	43.1% (41.9–44.3)
Strength training										
<1 day/week	27.1%[d,f] (24.7–29.5)	30.7% (28.7–32.6)	29.9% (27.6–32.1)	32.5%[a] (30.5–34.4)	23.7%[f] (18.6–28.9)	35.3%[a,e] (31.6–38.9)	27.6% (20.5–34.6)	29.5% (28.0–31.0)	32.0% (30.5–33.6)	30.9% (29.8–32.0)
1–2 days/week	28.2% (25.6–30.7)	26.8% (25.0–28.7)	26.8% (24.8–28.9)	24.2%[g] (22.4–25.9)	24.9% (19.3–30.5)	29.4% (26.0–32.9)	34.4%[d] (27.9–40.9)	27.4% (26.0–28.9)	24.8% (23.4–26.2)	26.0% (25.0–27.0)
3+ days/week	44.7%[f] (41.9–47.5)	42.5%[f] (40.4–44.7)	43.3%[f] (40.9–45.7)	43.4%[f] (41.3–45.5)	51.3%[f] (45.2–57.4)	35.3%[a,b,c,d,e] (31.8–38.8)	38.0% (31.3–44.7)	43.0% (41.4–44.7)	43.2% (41.5–44.9)	43.1% (41.9–44.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[q] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated this way. Instead, it represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

Table 4.8
Strength Training in Past 30 Days, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
HP2020						
Muscle-strengthening activities on 3+ days/week (HP2020 target [2+ days/week]: 24.1%)[q]	45.4%[c,f] (43.0–47.7)	43.4%[c,f] (41.6–45.2)	37.8%[a,b,e] (36.0–39.7)	42.3% (36.4–48.2)	43.4%[c,f] (40.1–46.7)	36.7%[a,b,e] (34.6–38.7)
Strength training						
<1 day/week	31.3%[e] (29.2–33.5)	30.2%[c,e] (28.5–31.8)	34.9%[b,e] (33.1–36.6)	32.9% (27.4–38.4)	25.1%[a,b,c,f] (22.2–28.0)	31.2%[e] (29.3–33.1)
1–2 days/week	23.3%[c,e,f] (21.4–25.2)	26.4%[e,f] (24.8–28.0)	27.3%[a,f] (25.7–29.0)	24.8% (19.9–29.7)	31.5%[a,b] (28.5–34.4)	32.1%[a,b,c] (30.1–34.1)
3+ days/week	45.4%[c,f] (43.0–47.7)	43.4%[c,f] (41.6–45.2)	37.8%[a,b,e] (36.0–39.7)	42.3% (36.4–48.2)	43.4%[c,f] (40.1–46.7)	36.7%[a,b,e] (34.6–38.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[q] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated this way. Instead, it represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

a quarter (26.0 percent) reported in engaging in 1–2 days of strength training per week (95-percent CI: 25.0–27.0; Table 4.7).

- Table 4.8 shows an inverse relationship between rank and frequency of strength training. A statistically significantly larger percentage of junior enlisted personnel (E1–E4) (45.4 percent, 95-percent CI: 43.0–47.7) reported in engaging in strength training three or more days per week as compared with senior enlisted ranks and senior officer ranks (37.8 percent, 95-percent CI: 36.0–39.7 percent among E7–E9, 36.7%, 95-percent CI: 34.6–38.7 among O4–O6).
- Table 4.9 shows that a statistically significantly larger percentage of men reported engaging in strength training three or more days a week as compared with women (45.4 percent, 95-percent CI: 44.0–46.8; and 34.3 percent, 95-percent CI: 32.5–36.1, respectively).
- Appendix Table D.6 shows that the two oldest age groups (35–44 years and 45+) were statistically significantly less likely to report strength training three or more days a week than the two younger age groups.

Table 4.9
Strength Training in Past 30 Days, by Gender

	Men	Women
HP2020		
Muscle-strengthening activities on 3+ days/week (HP2020 target [2+ days/week]: 24.1%)[q]	45.4%[a] (44.0–46.8)	34.3% (32.5–36.1)
Strength training		
<1 day/week	29.3%[a] (28.0–30.6)	37.2% (35.3–39.2)
1–2 days/week	25.3%[a] (24.2–26.5)	28.5% (26.8–30.1)
3+ days/week	45.4%[a] (44.0–46.8)	34.3% (32.5–36.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[q] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated this way. Instead, it represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

Screen Time

Screen time, which we defined as time spent looking at a desktop or laptop computer, television, smartphone, tablet (e.g., iPad, Kindle), or other handheld device or gaming system, is generally a sedentary behavior (Carson, Staiano, and Katzmarzyk, 2015). Sedentary behavior in relation to screen time is associated with an elevated risk of obesity and mortality (Thorp et al., 2011). Evidence also shows that sedentary behavior associated with screen time is a risk factor for many cardiometabolic diseases and mortality, independent of time spent exercising—meaning that adverse health effects were observed in people who exercise but also engage in excessive screen time (Owen et al., 2010; Stamatakis, Hamer, and Dunstan, 2011). Prospective longitudinal research shows that every hour of increase in television watching is associated with an increased hazard of all-cause mortality and cardiovascular death (Wijndaele et al., 2010). Furthermore, higher levels of screen time are associated with depression among adults (Madhav, Sherchand, and Sherchan, 2017). Chronic diseases, such as cardiometabolic disease, and mental illnesses, such as depression, are a leading cause of disability and threaten the readiness of troops to deploy (DoD, 2017b). Service members with chronic conditions might be unable to engage in more physically demanding missions, and they cannot be deployed to remote locations with limited medical support (Army Public Health Center, 2015).

The 2018 HRBS asked service members how many hours, on average, were spent each day using a screen for activities other than work or school over the last 30 days. This question differed from the 2015 HRBS, which only asked respondents how many hours per day they played electronic games outside of work or school. For each measure, we describe level of self-reported screen time overall and by service branch, pay grade, and gender in Tables 4.10 through 4.12; results by race/ethnicity and age group are available in Appendix D. Key findings include the following:

Table 4.10
Hours per Day of Screen Time by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
< 1 hour per day	9.3% (7.9–10.7)	10.4%[c,e,f] (9.2–11.7)	7.5%[b] (6.5–8.6)	8.3% (7.2–9.4)	4.8%[b] (2.6–7.1)	6.4%[b] (4.9–7.8)	10.3% (6.7–13.8)	7.4% (6.7–8.1)	8.8% (7.9–9.7)	8.2% (7.6–8.8)
1–4 hours per day	66.3% (63.6–69.1)	68.9%[d] (66.9–70.9)	64.3% (62.0–66.7)	63.8%[b] (61.7–65.8)	71.0% (65.7–76.4)	67.5% (64.1–70.9)	67.5% (61.1–73.9)	66.0% (64.4–67.6)	65.0% (63.4–66.6)	65.4% (64.3–66.6)
5+ hours per day	24.3% (21.7–27.0)	20.6%[c,d,f] (18.9–22.4)	28.1%[b] (25.8–30.4)	27.9%[b] (26.0–29.9)	24.1% (19.0–29.2)	26.1%[b] (22.9–29.4)	22.2% (16.4–28.0)	26.6% (25.1–28.1)	26.2% (24.6–27.7)	26.4% (25.3–27.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate

Table 4.11
Hours per Day of Screen Time, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
< 1 hour per day	6.1%[b,c,d,e,f] (5.0–7.3)	8.6%[a,c,f] (7.7–9.6)	11.7%[a,b] (10.5–12.8)	10.7%[a] (7.6–13.9)	9.0%[a] (7.3–10.8)	11.5%[a,b] (10.2–12.8)
1–4 hours per day	62.4%[b,e,f] (60.1–64.7)	67.4%[a,c,f] (65.7–69.1)	63.5%[b,e,f] (61.7–65.3)	69.2% (64.0–74.5)	70.6%[a,c] (67.5–73.7)	71.6%[a,b,c] (69.7–73.4)
5+ hours per day	31.5%[b,c,d,e,f] (29.3–33.6)	24.0%[a,f] (22.4–25.6)	24.8%[a,f] (23.2–26.5)	20.0%[a] (15.4–24.7)	20.4%[a] (17.5–23.2)	16.9%[a,b,c] (15.4–18.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 4.12
Hours per Day of Screen Time, by Gender

	Men	Women
< 1 hour per day[z]	8.2% (7.4–8.9)	8.3% (7.4–9.2)
1–4 hours per day[z]	65.6% (64.3–67.0)	64.7% (62.9–66.5)
5+ hours per day[z]	26.2% (24.9–27.5)	27.0% (25.2–28.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- Overall, 65.4 percent of reserve component service members reported spending one to four hours per day looking at screens (95-percent CI: 64.3–66.6), and 26.4 percent reported spending five or more hours per day looking at screens (95-percent CI: 25.3–27.5; Table 4.10).
- Table 4.11 shows that senior officers (O4–O6) were least likely of all the pay grade groups to report engaging in five or more hours of screen time per day (16.9 percent, 95-percent CI: 15.4–18.5). In contrast, junior enlisted service members (E1–E4) were the most likely to report engaging in five hours or more of screen time per day (31.5 percent, 95-percent CI: 29.3–33.6). The differences between these groups was statistically significant.
- There was no significant difference in the reported use of screens by gender (Table 4.12).
- Non-Hispanic white personnel were statistically significantly less likely to report engaging in five or more hours of screen time compared with all other race/ethnicity groups (22.6 percent, 95-percent CI: 21.3–24.0). Full details of these findings can be found in Appendix Table D.7.

Annual Physical Assessment

Routine medical exams are used to identify asymptomatic illnesses, provide early intervention, and encourage healthy behavior (Merenstein, Daumit, and Powe, 2006). These exams have been shown to both save lives through early detection of cancer and chronic conditions and save money (Goede et al., 2015; Birtwistle and Earnshaw, 2014). The military requires an annual face-to-face medical assessment for both active and reserve components (Defense Health Agency, 2016). These medical assessments, called PHAs, become part of service members' medical records and are used to ensure and evaluate force readiness (Defense Health Agency, 2016). Medical readiness means that service members are free from health-related conditions that could limit their ability to carry out their duties. For example, in 2018, 11 percent of Army reservists—roughly 230,000—were not deployable because they did not meet deployment standards, and of those, 99,000 were not deployable due to administrative reasons, including failure to have a documented medical exam (Copp, 2018a).

The 2018 HRBS asked participants whether they had received a routine medical checkup in the previous 12 months. *Routine checkup* was defined as a general physical exam, not an exam for a specific injury, illness, or condition. In Tables 4.13 through 4.15, we present the overall percentage of service members who reported receiving an annual physical exam in the past 12 months and by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Key findings are below:

- Overall, 71.6 percent of service members reported receiving a routine medical checkup in the previous year (95-percent CI: 70.4–72.7; Table 4.13). These findings suggest that not all service members are receiving the required annual exam.
- Junior enlisted personnel were significantly less likely than all other pay grades to report having had a routine medical checkup in the last year (62.0 percent, 95-percent CI: 59.7–64.3; Table 4.14).
- Men were significantly less likely to report having received a routine medical exam in the last year (70.6 percent, 95-percent CI: 69.2–72.0 among men, versus 75.4 percent, 95-percent CI: 73.5–77.2 among women; Table 4.15).
- Non-Hispanic Asian service members were significantly less likely than all other races/ethnicities to report having had a routine medical checkup in the last year (63.0 percent, 95-percent CI: 58.2–67.7). More details can be found in Appendix Table D.9.

Table 4.13
Past-Year Routine Medical Checkup, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Routine checkup in past year	76.8%[b,d,e,g] (74.5–79.1)	70.6%[a,c,g] (68.6–72.6)	76.7%[b,d,e,g] (74.5–78.9)	67.5%[a,c,f,g] (65.4–69.7)	66.8%[a,c,g] (61.1–72.6)	75.0%[d,g] (71.1–79.0)	89.0%[a,b,d,c,e,f] (84.6–93.4)	75.6% (74.1–77.1)	68.3% (66.6–69.9)	71.6% (70.4–72.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 4.14
Past-Year Routine Medical Checkup, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Routine checkup in past year	62.0%[b,c,d,e,f] (59.7–64.3)	75.4%[a,c,d,f] (73.7–77.0)	81.9%[a,b] (80.5–83.4)	87.4%[a,b,e] (83.2–91.6)	78.8%[a,d,f] (76.2–81.5)	84.4%[a,b,e] (82.9–85.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 4.15
Past-Year Routine Medical Checkup, by Gender

	Men	Women
Routine checkup in past year	70.6%[a] (69.2–72.0)	75.4% (73.5–77.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Insurance Status

The rate of uninsured individuals in the United States has been steadily declining since 2008, and the HP2020 goal is that 100 percent of Americans have health insurance of some kind (HHS, 2019). This reduction in the number of uninsured individuals is in large part because of passage of the Patient Protection and Affordable Care Act (Public Law 111-148, 2010; Glied, Ma, and Verbofsky, 2016). In 2018, 8.5 percent of Americans were without public or private health insurance (Berchick, Barnett, and Upton, 2019). Not having access to health insurance has been shown to decrease utilization of preventive care, delay utilization of care during injury or illness, and lead to worse health outcomes, such as being hospitalized for chronic diseases (e.g., diabetes) (Starfield, Shi, and Macinko, 2005; Schriver, 1999; Henry, 2014; Freeman et al., 2008). Health insurance status is particularly important for reserve component service members because non–active-duty service members are generally not DoD health care beneficiaries (Title 10 U.S. Code § 1086), and deferred health care due to lack of insurance may threaten medical deployability (Wilmoth, 2010; Title 10 U.S. Code § 1086). In most but not all instances, non–active-duty reserve component service members are reliant on private or other public (e.g., U.S. Department of Veterans Affairs [VA], Medicaid, Medicare) health insurance options.

Reserve component respondents in the 2018 HRBS were asked about their health insurance status. They were asked to identify what, if any, type of insurance plan they currently were covered by. In Tables 4.16 through 4.18, we present the overall percentage of what insur-

Table 4.16
Current Health Insurance, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Currently covered by any type of health insurance	97.3%[c,d,e] (96.4–98.2)	97.6%[c,d,e] (96.8–98.3)	90.9%[a,b] (89.3–92.4)	89.2%[a,b,g] (87.5–90.8)	91.6%[a,b] (88.0–95.2)	94.9% (92.1–97.8)	98.2%[d] (96.0–100.0)	92.9% (91.9–94.0)	91.2% (89.9–92.5)	92.0% (91.1–92.8)
Currently covered by TRICARE or other military health insurance	64.2%[d,f] (61.5–66.9)	61.8%[d,f] (59.7–63.9)	60.1%[f] (57.6–62.6)	57.2%[a,b,f] (55.0–59.4)	64.2% (58.1–70.4)	71.4%[a,b,c,d] (68.3–74.6)	60.7% (53.5–68.0)	63.2% (61.6–64.9)	58.4% (56.7–60.1)	60.6% (59.4–61.8)
Currently covered by VA, including CHAMPVA health insurance	11.2%[c,d,f] (9.4–12.9)	11.0%[c,d,f] (9.6–12.3)	18.2%[a,b,e] (16.4–19.9)	15.1%[a,b,e] (13.7–16.4)	8.9%[c,d,f] (6.0–11.8)	18.3%[a,b,e] (15.8–20.9)	10.7% (6.5–14.8)	15.7% (14.6–16.8)	14.0% (13.0–15.1)	14.8% (14.0–15.6)
Currently covered by private health insurance	47.5%[f] (44.7–50.3)	49.5%[c,d,f] (47.3–51.7)	42.6%[b] (40.1–45.0)	44.0%[b,f] (41.9–46.2)	39.7% (33.5–46.0)	36.8%[a,b,d,g] (33.5–40.2)	50.0%[f] (42.8–57.1)	42.4% (40.8–44.1)	45.4% (43.7–47.1)	44.1% (42.9–45.2)
Currently covered by government health insurance for lower income individuals	1.9%[c,d] (1.1–2.7)	1.6%[c,d] (1.1–2.1)	6.5%[a,b,g] (4.9–8.1)	6.4%[a,b,g] (5.1–7.6)	3.2% (1.2–5.3)	3.2% (0.6–5.9)	0.9%[c,d] (0.0–1.8)	4.6% (3.6–5.6)	5.1% (4.2–6.1)	4.9% (4.2–5.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. CHAMPVA = Civilian Health and Medical Program of the Department of Veterans Affairs.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 4.17
Current Health Insurance, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Currently covered by any type of health insurance	85.4% [b,c,d,e,f] (83.6–87.3)	95.3% [a,c,f] (94.4–96.2)	98.5% [a,b] (98.0–99.0)	98.6% [a] (97.0–100.0)	97.3% [a,f] (96.3–98.4)	98.9% [a,b,e] (98.4–99.3)
Currently covered by TRICARE or other military health insurance	51.9% [b,c,d,e,f] (49.5–54.4)	66.5% [a] (64.8–68.3)	66.3% [a] (64.5–68.1)	61.9% [a] (56.1–67.7)	62.9% [a] (59.5–66.4)	68.4% [a] (66.5–70.4)
Currently covered by VA, including CHAMPVA health insurance	7.0% [b,c,d,e,f] (5.8–8.1)	21.6% [a,e,f] (20.0–23.1)	19.3% [a,d] (17.8–20.8)	26.7% [a,c,e,f] (21.4–32.0)	15.2% [a,b,d] (12.5–17.9)	16.9% [a,b,d] (15.4–18.5)
Currently covered by private health insurance	46.8% [b,c] (44.3–49.2)	40.6% [a,d] (38.8–42.5)	42.1% [a,d] (40.3–44.0)	53.1% [b,c,f] (47.2–59.0)	46.0% (42.6–49.3)	43.2% [d] (41.1–45.3)
Currently covered by government health insurance for lower income individuals	10.2% [b,c,d,e,f] (8.6–11.9)	1.9% [a] (1.4–2.5)	1.2% [a] (0.8–1.6)	0.5% [a] (0.0–1.1)	0.9% [a] (0.4–1.4)	1.0% [a] (0.6–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

ance plan, if any, reserve service members were covered under and by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Key findings are below:

- Overall, 92 percent of reserve component respondents reported having some kind of health insurance (95-percent CI: 91.1–92.8; Table 4.16). This falls short of the HP2020 goal of 100-percent coverage. Given very limited reserve component access to TRICARE and the military health system (MHS), it is not surprising that this figure is about the same as for the general public: In 2018, 91.5 percent of Americans had some form of health insurance (Berchick, Barnett, and Upton, 2019).
- A significantly smaller portion of junior enlisted respondents reported having any type of health insurance (85.4 percent, 95-percent CI: 83.6–87.3) compared with all other pay grades. Not surprisingly, a significantly smaller portion of junior enlisted personnel also reported receiving insurance through the VA (7.0 percent, 95-percent CI: 5.8–8.1). This is likely because far fewer junior enlisted respondents had incurred an injury that made them eligible for VA health coverage (Table 4.17).

Table 4.18
Current Health Insurance, by Gender

	Men	Women
Currently covered by any type of health insurance	91.7%[a] (90.6–92.7)	93.2% (92.1–94.3)
Currently covered by TRICARE or other military health insurance[z]	60.1% (58.7–61.5)	62.4% (60.4–64.5)
Currently covered by VA, including CHAMPVA health insurance	15.6%[a] (14.7–16.5)	11.8% (10.8–12.8)
Currently covered by private health insurance	45.5%[a] (44.1–46.9)	38.4% (36.5–40.3)
Currently covered by government health insurance for lower income individuals	4.1%[a] (3.4–4.9)	7.8% (6.1–9.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- Women were also significantly more likely to report having any form of health insurance as compared with men (93.2 percent, 95-percent CI: 92.1–94.3 for women, versus 91.7 percent, 95-percent CI: 90.6–92.7 for men). However, women were also significantly more likely to report receiving coverage through a low-income government program (e.g., Medicare) (7.8 percent, 95-percent CI: 6.1–9.5 for women, versus 4.1 percent, 95-percent CI: 3.4–4.9 for men; Table 4.18).
- Non-Hispanic white respondents were the most likely to report any type of insurance (93.9 percent, 95-percent CI: 92.9–94.9) and the least likely to report coverage through a low-income government program (3.0 percent, 95-percent CI: 2.3–3.6) as compared with all other races and ethnicities (Appendix Table D.11).
- Similarly, respondents in the youngest age group (17–24 years) were the least likely to report any type of insurance coverage (84.9 percent, 95-percent CI: 82.5–87.3) and the most likely to receive insurance through a low-income government program (12.1 percent, 95-percent CI: 9.8–14.4) as compared with all other age groups (Appendix Table D.12).

Sleep Health

In 2017, over two-thirds of Americans, 67.5 percent, got seven or more hours of sleep per night (CDC, 2015c; Healthy People, 2020q). According to HP2020, sufficient sleep is categorized as at least seven hours in a 24-hour period among U.S. adults age 22 and over.[1] The HP2020 goal for sufficient sleep is 72.8 percent of the adult population (Healthy People, 2020p). Lack of suf-

[1] The HP2020 goal for adults between the ages of 18 and 21 is eight hours of sleep per 24-hour period.

ficient sleep is associated with daytime sleepiness, fatigue, diabetes, cardiovascular disease, obesity, and depression (Kasasbeh, Chi, and Krishnaswamy, 2006; Knutson et al., 2006; Taheri, 2006; Zimmerman et al., 2006). In the United States, 18.8 percent of adults report suffering from insomnia, and 12.7 percent report excessive daytime sleepiness (Ford et al., 2015).

Problems with sleep, such as insomnia, were reported among both active and reserve component service members (Troxel, Shih, et al., 2015; Seelig et al., 2016). Research shows that 18 percent of service members used sleep medications to manage their inability to sleep (Troxel et al., 2015). However, it is important to note that while this study included both active and reserve component service members, it did not analyze them separately. Research also shows that among a sample that included both active duty and reserve component service members, 23 percent screened positive for insomnia symptoms (Seelig et al., 2016). Sleep disturbances are associated with common conditions among reserve component service members, such as PTSD and depression (Hansen et al., 2018). Sleep problems are particularly problematic for force readiness because not only is lack of sleep associated with chronic illness and mental illness, but it can also impact assessing and appropriately responding to threats in combat (Army Public Health Center, 2015). Research also shows that lack of sleep impacts aerobic capacity, muscular endurance, and "military-specific performance" (Grandou et al., 2019). Lack of sleep has also been shown to lead to lower self-rated health scores, lost work days, lower odds of deployment, higher odds of early discharge from military service, and more health care utilization among military populations (Seelig et al., 2016).

Respondents in the 2018 HRBS were asked how much sleep they got on average in a 24-hour period over the last 30 days, the quality of that sleep, how sleep impacted their energy levels, and any medications they may take to aid with sleep. For each measure, we describe the results by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Where available, we report on comparable percentages from the U.S. general population.

Average Daily Sleep Amount

Respondents in the 2018 HRBS were asked how many hours of sleep they got on average over a 24-hour period in the last 30 days. Key findings are below, and tabular results are presented in Tables 4.19 through 4.21:

- Overall, less than half (45.4 percent, 95-percent CI: 44.2–46.6) of service members met the HP2020 standards for sufficient sleep. The HP2020 goal is 72.8 percent (Healthy People, 2020p). The percentage for service members is also a far smaller percentage than the general public: 68.3 of Americans got sufficient sleep in accordance with the HP2020 definition (CDC, 2015c) (Table 4.19).
- Senior enlisted service members (E7–E9) were significantly less likely than all officer pay grade groups and junior enlisted pay groups to report meeting the HP2020 sleep goals over the past 30 days (39.1 percent, 95-percent CI: 37.3–40.9 for E7–E9 versus 50.8 percent, 95-percent CI: 47.5–54.0 for O1–O3, 51.3 percent, 95-percent CI: 49.2–53.4 for O4–O6, and 47.4 percent, 95-percent CI: 45.1–49.7 for E1–E4; Table 4.20).
- There was no statistically significant difference between men and women for meeting HP2020 goals for sufficient sleep. Just over 45 percent for both genders met the goal (Table 4.21).

Table 4.19
Past 30 Days Average Daily Hours of Sleep, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
HP2020										
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 target: 72.8%)	50.2%[c,d] (47.4–52.9)	50.8%[c,d] (48.6–52.9)	44.6%[a,b] (42.2–47.0)	43.5%[a,b] (41.4–45.6)	41.5% (35.4–47.7)	45.4% (41.6–49.2)	52.1% (45.0–59.2)	45.6% (43.9–47.2)	45.2% (43.6–46.9)	45.4% (44.2–46.6)
Hours of sleep per 24-hour period										
≤ 4 hours	3.6%[c,d,f] (2.6–4.6)	4.0%[c,d] (3.1–4.9)	6.9%[a,b] (5.8–8.1)	7.2%[a,b] (6.1–8.4)	6.3% (3.5–9.2)	6.6%[a] (4.9–8.3)	2.7% (1.0–4.5)	6.1% (5.4–6.9)	6.5% (5.6–7.4)	6.3% (5.7–6.9)
5–6 hours[z]	45.2% (42.4–48.0)	43.4% (41.3–45.6)	45.6% (43.2–48.0)	46.1% (44.0–48.2)	50.0% (43.9–56.1)	45.9% (42.3–49.6)	44.3% (37.4–51.3)	46.0% (44.4–47.7)	45.5% (43.8–47.1)	45.7% (44.6–46.9)
7+ hours	51.2% (48.4–54.0)	52.6%[c,d] (50.4–54.7)	47.4%[b] (45.0–49.9)	46.7%[b] (44.5–48.8)	43.7% (37.5–49.8)	47.5% (43.7–51.3)	52.9% (45.9–60.0)	47.9% (46.2–49.5)	48.1% (46.4–49.8)	48.0% (46.8–49.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.20
Past 30 Days Average Daily Hours of Sleep, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
HP2020						
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 target: 72.8%)	47.4%[b,c] (45.1–49.7)	42.2%[a,e,f] (40.4–44.0)	39.1%[a,e,f] (37.3–40.9)	43.6% (37.7–49.4)	50.8%[b,c] (47.5–54.0)	51.3%[b,c] (49.2–53.4)
Hours of sleep per 24-hour period						
≤ 4 hours	5.9%[f] (4.8–7.1)	7.5%[e,f] (6.5–8.5)	7.8%[e,f] (6.8–8.9)	7.5%[f] (4.7–10.3)	4.3%[b,c] (2.8–5.7)	3.0%[a,b,c,d] (2.3–3.7)
5–6 hours	40.6%[b,c,f] (38.3–42.9)	50.2%[a,f] (48.4–52.0)	53.1%[a,e,f] (51.2–54.9)	48.9% (43.0–54.8)	45.0%[c] (41.7–48.3)	45.7%[a,b,c] (43.6–47.8)
7+ hours	53.5%[b,c,d] (51.1–55.8)	42.3%[a,e,f] (40.5–44.1)	39.1%[a,e,f] (37.3–40.9)	43.6%[a] (37.7–49.4)	50.8%[b,c] (47.5–54.0)	51.3%[b,c] (49.2–53.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 4.21
Past 30 Days Average Daily Hours of Sleep, by Gender

	Men	Women
HP2020		
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 target: 72.8%)[z]	45.3% (43.9–46.7)	45.6% (43.7–47.5)
Hours of sleep per 24-hour period		
≤ 4 hours[z]	6.3% (5.6–7.0)	6.4% (5.5–7.3)
5–6 hours	46.3%[a] (44.9–47.7)	43.6% (41.7–45.4)
7+ hours	47.4%[a] (46.0–48.9)	50.0% (48.1–51.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Sleep Quality

Respondents were asked how they would rate their sleep (very good to very bad) over the last 30 days. Key findings are below, and full details are in Tables 4.22 through 4.24:

- Overall, 15.8 percent of service members rated their sleep as very good (95-percent CI: 14.9–16.7), and 3.9 percent rated their sleep as very bad (95-percent CI: 3.4–4.4; Table 4.22). An additional 21.3 percent rated their sleep as fairly bad (95-percent CI: 20.4–22.3).
- Senior enlisted reserve component members reported significantly worse sleep than all other pay grades except warrant officers. Just 11.2 percent (95-percent CI: 10.0–12.4) rated their sleep as very good (Table 4.23).
- Men were significantly more likely to rate their sleep as very good and significantly less likely to report their sleep as very bad as compared with women (Table 4.24).

Table 4.22
Sleep Quality in Past 30 Days, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Very good[z]	17.0% (15.1–19.0)	16.1% (14.5–17.7)	17.3% (15.3–19.2)	14.7% (13.1–16.3)	15.7% (11.2–20.2)	15.7% (12.5–18.9)	13.6% (9.0–18.2)	16.7% (15.5–18.0)	15.0% (13.7–16.3)	15.8% (14.9–16.7)
Fairly good	61.1% (58.4–63.8)	63.2%[c,d] (61.1–65.3)	57.8%[b] (55.4–60.2)	58.3%[b] (56.3–60.4)	54.9% (48.8–60.9)	58.5% (54.8–62.2)	65.3% (58.8–71.9)	58.3% (56.7–60.0)	59.5% (57.8–61.2)	59.0% (57.8–60.1)
Fairly bad	20.0% (17.6–22.3)	18.4%[d] (16.7–20.0)	20.6% (18.7–22.4)	22.5%[b] (20.8–24.3)	23.4% (18.5–28.4)	22.3% (19.5–25.1)	19.6% (14.2–25.0)	21.0% (19.8–22.3)	21.6% (20.2–22.9)	21.3% (20.4–22.3)
Very bad	1.9%[c,d,e] (1.2–2.6)	2.3%[c,d,e] (1.6–3.0)	4.4%[a,b] (3.5–5.2)	4.4%[a,b] (3.5–5.3)	6.0%[a,b] (3.1–8.8)	3.5% (2.3–4.7)	1.5% (0.2–2.7)	3.9% (3.3–4.5)	3.9% (3.2–4.6)	3.9% (3.4–4.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.23
Sleep Quality in Past 30 Days, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Very good	18.5%[b,c] (16.6–20.4)	13.9%[a,c] (12.6–15.1)	11.2%[a,b,e,f] (10.0–12.4)	15.5% (11.0–19.9)	15.8%[c] (13.5–18.0)	15.5%[c] (14.0–17.0)
Fairly good[z]	59.0% (56.7–61.3)	58.5% (56.7–60.3)	58.2% (56.4–60.1)	53.2% (47.4–59.1)	61.3% (58.1–64.6)	61.0% (59.0–63.1)
Fairly bad	18.8%[b,c,d] (17.0–20.6)	23.0%[a] (21.5–24.6)	25.8%[a,e,f] (24.2–27.5)	28.3%[a] (23.0–33.6)	20.4%[c] (17.5–23.3)	21.4%[c] (19.7–23.1)
Very bad	3.7%[f] (2.8–4.6)	4.6%[e,f] (3.8–5.4)	4.8%[e,f] (3.9–5.6)	3.0% (1.3–4.7)	2.5%[b,c] (1.7–3.4)	2.1%[a,b,c] (1.5–2.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.24
Sleep Quality in Past 30 Days, by Gender

	Men	Women
Very good	16.4%[a] (15.3–17.5)	13.4% (11.9–14.9)
Fairly good[z]	58.9% (57.5–60.3)	59.4% (57.5–61.3)
Fairly bad[z]	21.0% (19.9–22.1)	22.5% (21.0–24.1)
Very bad	3.7%[a] (3.1–4.3)	4.7% (3.9–5.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Lack of Energy Due to Poor Sleep

Service members were asked to rate how much they were bothered by a lack of energy due to poor sleep over the past week. Responses ranged from not bothered at all to severely bothered. Key findings are below, and detailed findings can be found in Tables 4.25 through 4.27:

- Overall, 19.0 percent of service members reported being severely or moderately bothered by a lack of energy due to poor sleep over the past week (95-percent CI: 18.1–19.9; Table 4.25). This is compared with just 12.7 percent of the general public reporting excessive daytime sleepiness due to lack of sleep in 2012 (Ford et al., 2015).

Table 4.25
Moderate to Severe Lack of Energy Due to Poor Sleep, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Moderate to severe lack of energy due to poor sleep	12.3%[c,d,e,f] (10.6–14.1)	13.4%[c,d,e,f] (12.0–14.8)	19.6%[a,b] (17.8–21.3)	21.0%[a,b] (19.3–22.6)	21.8%[a,b] (17.0–26.5)	21.8%[a,b] (18.5–25.2)	15.3% (10.6–20.0)	18.7% (17.5–20.0)	19.2% (17.9–20.5)	19.0% (18.1–19.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 4.26
Lack of Energy Due to Poor Sleep in the Past Week, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Moderate to severe lack of energy due to poor sleep	18.1%[c] (16.3–19.8)	20.2%[f] (18.7–21.6)	21.7%[a,f] (20.1–23.2)	22.1% (17.2–26.9)	17.4% (14.7–20.1)	16.2%[b,c] (14.7–17.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 4.27
Lack of Energy Due to Poor Sleep in the Past Week, by Gender

	Men	Women
Moderate to severe lack of energy due to poor sleep	17.9%[a] (16.8–18.9)	23.3% (21.7–25.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

- Being moderately to severely bothered by a lack of energy due to sleep loss in the past week was least likely to be reported among senior officers (O4–O6) (16.2 percent, 95-percent CI: 14.7–17.7). However, this was only significantly different from ranks E5–E9 (Table 4.26).
- Women were significantly more likely than men to report being bothered by moderate to severe lack of energy due to poor sleep in the past week (23.3 percent, 95-percent CI: 21.7–25.0 among women, versus 17.9 percent, 95-percent CI: 16.8–18.9 among men; Table 4.27).
- Reserve component service members ages 17–24 were significantly less likely than any other age group to report being moderately to severely bothered by a lack of energy due to sleep loss (Appendix Table D.18).

Use of Medications to Sleep

Respondents were asked how often they used over-the-counter (OTC) or prescription medications to assist with sleep over the last 30 days. Response options ranged from not at all during the past 30 days to daily. Detailed findings are presented in Tables 4.28 through 4.30, and key findings are below:

- Overall, 9.4 percent (95-percent CI: 8.8–10.1) of service members reported using OTC or prescription medications to sleep occasionally (i.e., less than once per week or one to two times per week) over the past 30 days, and 6.2 percent (95-percent CI: 5.6–6.7) reported

Table 4.28
Past-30-Day Use of Sleep Medication, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Never	84.9% (83.1–86.8)	85.0% (83.5–86.5)	82.9%[e] (81.2–84.7)	84.6% (83.2–86.1)	89.9%[c,f] (86.7–93.2)	82.6%[e] (80.1–85.2)	87.1% (83.1–91.1)	84.1% (82.9–85.2)	84.7% (83.6–85.9)	84.4% (83.6–85.2)
Occasionally (less than once per week, 1–2 times per week	10.4%[e] (8.7–12.0)	9.7%[e] (8.5–11.0)	9.9%[e] (8.5–11.3)	9.3% (8.1–10.4)	4.7%[a,b,c,f] (2.6–6.8)	10.2%[e] (8.2–12.3)	5.8% (3.3–8.2)	9.4% (8.5–10.3)	9.4% (8.5–10.3)	9.4% (8.8–10.1)
Frequently (3 or more times per week)[z]	4.7% (3.7–5.7)	5.3% (4.3–6.3)	7.2% (6.0–8.3)	6.1% (5.2–7.0)	5.4% (2.8–7.9)	7.2% (5.5–8.8)	7.1% (3.9–10.4)	6.5% (5.8–7.3)	5.9% (5.2–6.6)	6.2% (5.6–6.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.29
Past-30-Day Use of Sleep Medication, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Never	87.9%[b,c,f] (86.5–89.4)	81.6%[a] (80.2–83.0)	80.5%[a] (79.0–81.9)	83.4% (79.4–87.4)	84.3% (81.9–86.6)	82.4%[a] (80.8–83.9)
Occasionally (less than once per week, 1–2 times per week)	7.9%[c] (6.7–9.1)	10.3% (9.2–11.4)	10.6%[a] (9.5–11.8)	9.8% (6.5–13.1)	11.0% (8.9–13.2)	10.4% (9.1–11.6)
Frequently (3 or more times per week)	4.1%[b,c,f] (3.2–5.0)	8.1%[a,e] (7.1–9.1)	8.9%[a,e] (7.8–9.9)	6.9% (4.4–9.4)	4.7%[b,c,f] (3.6–5.8)	7.3%[a,e] (6.2–8.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 4.30
Past-30-Day Use of Sleep Medication, by Gender

	Men	Women
Never	85.3%[a] (84.4–86.3)	81.0% (79.5–82.4)
Occasionally (less than once per week, 1–2 times per week)	8.8%[a] (8.1–9.6)	11.7% (10.4–12.9)
Frequently (3 or more times per week)	5.9%[a] (5.2–6.5)	7.4% (6.5–8.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

using these medications frequently (i.e., three or more times per week in the past 30 days) (Table 4.28).

- Senior enlisted service members and senior officers were more likely to report using sleep medications three or more times per week over the past 30 days as compared with other pay grade groups; however, this was only significant when compared with junior enlisted service members and junior officers (Table 4.29).
- Significantly more women (7.4 percent, 95-percent CI: 6.5–8.2) than men (5.9 percent, 95-percent CI: 5.2–6.5) used sleep medications three or more times per week over the past 30 days (Table 4.30).
- Significantly more reserve component service members 45 years of age or older used sleep medications three or more times a week as compared with all other age groups (9.4 percent, 95-percent CI: 8.5–10.2). Full details are available in Appendix Table D.20.

Use of Substances to Stay Awake

Energy supplements, in the form of caffeinated beverages, OTC medication, and prescription medications, have been shown to be an ergogenic aid for endurance and to assist with anaerobic activities (Ballard, Wellborn-Kim, and Clauson, 2010; Kazemi et al., 2009; Ganio et al., 2009). However, they can also have negative consequences. Consumption of caffeine-containing drinks is associated with sleep disruptions and sleeping less than four hours per night (Lieberman et al., 2012). Population-level research shows that 15 percent of Americans reported having used a caffeinated energy drink in the previous 30 days (Lin et al., 2016). Energy drinks were also more likely to be used among those who got five or fewer hours of sleep among a sample that included both active and reserve component service members (Jacobson, Horton, et al., 2012). Concerns about the safety of energy drinks has led military leadership to question policies around the sale of these beverages at military installations (Cohen and Edgar, 2013).

The 2018 HRBS asked participants to report frequency of past-30-day use of several substances to stay awake: energy drinks, other caffeinated beverages (e.g., tea, coffee), OTC medications, and prescription medications. In Tables 4.31 through 4.33, we present overall results for each measure, as well as results by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Key findings include the following:

- Overall, service members reported using energy drinks routinely: 38.4 percent reported using them over the past 30 days (Table 4.31). In 2014, just 15 percent of the general population reported using energy drinks at all in the previous 30 days (Lin et al., 2016).
- Use of other caffeinated beverages was also common: 72.1 percent of service members reported using such products to stay awake over the past 30 days (Table 4.31).
- Use of both OTC and prescription medications to stay awake were relatively rare. Roughly 3 percent of reserve component service members reported using each of these types of medication over the past 30 days (Table 4.31).
- Senior officers were significantly more likely to report not having used energy drinks in the past 30 days than all other pay grade groups (82.1 percent, 95-percent CI: 80.5–83.8; Table 4.32). Junior enlisted service members were significantly less likely than all other pay grade groups to report using other caffeinated beverages to stay awake three times or more a week over the past 30 days (37.3 percent, 95-percent CI: 35.1–39.5) and one or two times a week over the past 30 days (30.7 percent, 95-percent CI: 28.5–32.9). Differences in use of OTC and prescription medications to help stay awake by pay grade were substantively small and largely nonsignificant.
- Consistent with existing literature (Lieberman et al., 2012; Stephens et al., 2014), men were significantly more likely than women to report using energy drinks both one or two days a week and three or more times a week over the past 30 days (Table 4.33). However, there was no statistically significant difference between reported use of other caffeinated beverages, OTC medications, or prescription medications to stay awake between men and women.
- Service members between the ages of 25 and 34 were more likely than any other age group to have used energy drinks three or more times a week in the last 30 days (Appendix Table D.21).
- Non-Hispanic black service members were significantly less likely than other racial/ethnic groups to report using energy drinks to stay awake. Almost three-quarters, 71.3 percent (95-percent CI: 68.4–74.2), reported not having used them over the last 30 days (Appendix Table D.22).

Table 4.31
Past-30-Day Use of Substances to Stay Awake, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Past-30-day use of energy drinks to stay awake										
Never	67.9%[d,e] (65.3–70.5)	66.3%[d,e] (64.1–68.4)	65.3%[d,e] (62.9–67.6)	56.4%[a,b,c,f,g] (54.3–58.5)	53.6%[a,b,c,f,g] (47.5–59.6)	67.8%[d,e] (64.0–71.6)	71.1%[d,e] (64.5–77.7)	65.0% (63.4–66.7)	58.8% (57.1–60.5)	61.6% (60.4–62.8)
1–2 times per week	23.7%[d,e] (21.3–26.0)	24.4%[d,e] (22.5–26.3)	25.8% (23.5–28.0)	29.7%[a,b,f] (27.7–31.7)	33.1%[a,b,f] (27.4–38.8)	21.1%[d,e] (18.1–24.2)	22.4% (16.4–28.4)	25.3% (23.8–26.8)	28.4% (26.8–30.0)	27.0% (25.9–28.1)
3 or more times per week	8.4%[d] (6.9–10.0)	9.3%[d] (8.0–10.7)	9.0%[d] (7.6–10.4)	13.9%[a,b,c] (12.4–15.4)	13.3% (9.3–17.3)	11.0% (7.8–14.2)	6.5% (2.7–10.2)	9.6% (8.6–10.7)	12.8% (11.6–14.0)	11.4% (10.6–12.2)
Past-30-day use of other caffeinated beverages to stay awake										
Never	27.7% (25.2–30.3)	27.3% (25.3–29.2)	31.3%[d,f] (29.0–33.6)	26.6%[c] (24.7–28.5)	30.5% (24.8–36.1)	23.7%[c] (19.9–27.5)	25.1% (19.5–30.8)	29.2% (27.6–30.8)	26.8% (25.3–28.3)	27.9% (26.8–29.0)
1–2 times per week[z]	24.6% (22.2–27.0)	22.8% (20.9–24.6)	24.5% (22.3–26.7)	26.1% (24.2–28.1)	25.5% (19.8–31.2)	23.9% (20.7–27.1)	19.0% (13.8–24.3)	24.4% (23.0–25.9)	25.3% (23.8–26.9)	24.9% (23.8–26.0)
3 or more times per week	47.7% (44.9–50.5)	49.9%[c] (47.8–52.1)	44.2%[b,f,g] (41.8–46.5)	47.2% (45.1–49.3)	44.0% (38.0–50.0)	52.4%[c] (48.6–56.2)	55.9%[c] (48.9–62.8)	46.4% (44.7–48.0)	47.9% (46.2–49.5)	47.2% (46.0–48.4)
Past-30-day use of OTC medications to stay awake										
Never	97.8% (97.0–98.6)	98.1%[d] (97.4–98.7)	97.1% (96.3–97.8)	96.2%[b,g] (95.3–97.1)	97.9% (96.3–99.5)	97.0% (95.7–98.2)	99.3%[d] (98.6–100.0)	97.3% (96.8–97.8)	96.6% (96.0–97.3)	96.9% (96.5–97.4)
1–2 times per week[z]	1.5% (0.8–2.1)	1.2% (0.7–1.8)	1.6% (1.1–2.2)	2.3% (1.6–3.0)	1.0% (0.0–2.1)	1.9% (0.9–2.9)	0.4% (0.0–0.9)	1.6% (1.2–1.9)	2.1% (1.5–2.6)	1.8% (1.5–2.2)
3 or more times per week[z]	0.7% (0.2–1.2)	0.7% (0.4–1.0)	1.3% (0.9–1.8)	1.5% (0.9–2.0)	1.1% (0.0–2.2)	1.1% (0.4–1.8)	0.3% (0.0–0.8)	1.1% (0.8–1.4)	1.3% (0.9–1.7)	1.2% (0.9–1.5)

Table 4.31—continued

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Past-30-day use of prescription medications to stay awake										
Never	98.8%[c,d] (98.4–99.3)	98.4%[d] (97.9–98.9)	97.5%[a] (96.9–98.0)	96.1%[a,b] (95.1–97.0)	96.8% (94.8–98.8)	97.3% (96.2–98.5)	99.3% (98.4–100.0)	97.7% (97.2–98.1)	96.6% (95.9–97.3)	97.1% (96.7–97.5)
1–2 times per week	0.2%[d] (0.0–0.4)	0.5% (0.2–0.8)	0.7% (0.4–0.9)	1.5%[a] (0.9–2.1)	1.0% (0.0–2.3)	0.7% (0.0–1.3)	0.0% (0.0–1.6)	0.6% (0.4–0.8)	1.2% (0.8–1.7)	0.9% (0.7–1.2)
3 or more times per week	1.0%[d] (0.5–1.4)	1.2%[d] (0.8–1.6)	1.9% (1.4–2.4)	2.5%[a,b] (1.8–3.2)	2.2% (0.6–3.8)	2.0% (1.0–3.0)	0.7% (0.0–1.6)	1.7% (1.4–2.1)	2.2% (1.6–2.7)	2.0% (1.6–2.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.32
Past-30-Day Use of Substances to Stay Awake, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Past-30-day use of energy drinks to stay awake						
Never	57.4%[c,d,e,f] (55.0–59.7)	57.1%[c,d,e,f] (55.3–59.0)	70.9%[a,b,f] (69.1–72.7)	70.7%[a,b,f] (65.1–76.2)	68.1%[a,b,f] (65.1–71.1)	82.1%[a,b,c,d,e] (80.5–83.8)
1–2 times per week	30.0%[c,d,e,f] (27.8–32.2)	29.7%[c,d,e,f] (28.0–31.5)	20.4%[a,b,f] (18.8–22.0)	18.0%[a,b] (13.6–22.5)	23.8%[a,b,f] (21.0–26.5)	13.9%[a,b,c,e] (12.4–15.4)
3 or more times per week	12.6%[c,e,f] (11.1–14.2)	13.2%[c,e,f] (11.9–14.5)	8.7%[a,b,f] (7.6–9.9)	11.3%[f] (7.0–15.6)	8.1%[a,b,f] (6.3–10.0)	4.0%[a,b,c,d,e] (3.1–4.8)
Past-30-day use of other caffeinated beverages to stay awake						
Never	32.0%[b,c,e,f] (29.8–34.2)	24.8%[a] (23.2–26.3)	27.2%[a,f] (25.6–28.9)	27.2% (22.2–32.3)	23.6%[a] (20.7–26.6)	22.8%[a,c] (21.1–24.5)
1–2 times per week	30.7%[b,c,d,e,f] (28.5–32.9)	23.3%[a,c,d,f] (21.8–24.9)	16.7%[a,b] (15.3–18.1)	13.8%[a,b] (9.4–18.1)	20.6%[a] (18.0–23.3)	17.5%[a,b] (15.8–19.1)
3 or more times per week	37.3% [b,c,d,e,f] (35.1–39.5)	51.9%[a,c,f] (50.1–53.7)	56.0%[a,b] (54.2–57.9)	59.0%[a] (53.2–64.8)	55.8%[a] (52.5–59.0)	59.8%[a,b] (57.7–61.8)
Past-30-day use of OTC medications to stay awake						
Never	96.5%[f] (95.7–97.4)	96.8%[f] (96.1–97.5)	97.7% (97.1–98.3)	97.2% (95.3–99.2)	97.5% (96.3–98.6)	98.3%[a,b] (97.7–98.8)
1–2 times per week	2.2%[f] (1.5–2.9)	1.8%[f] (1.3–2.4)	1.4% (0.9–1.9)	2.5% (0.6–4.5)	1.4% (0.6–2.1)	0.7%[a,b] (0.3–1.0)
3 or more times per week[z]	1.3% (0.8–1.8)	1.4% (0.9–1.8)	0.9% (0.5–1.3)	0.2% (0.0–0.5)	1.1% (0.3–2.0)	1.0% (0.6–1.5)
Past-30-day use of prescription medications to stay awake						
Never	96.9%[f] (96.0–97.7)	96.9%[f] (96.3–97.5)	97.1%[f] (96.4–97.7)	96.3%[f] (94.1–98.5)	97.5% (96.4–98.7)	98.9%[a,b,c,d] (98.5–99.3)
1–2 times per week[z]	1.2% (0.6–1.7)	0.9% (0.6–1.2)	0.7% (0.3–1.1)	1.7% (0.2–3.3)	0.8% (0.2–1.4)	0.3% (0.1–0.4)
3 or more times per week[z]	2.0% (1.3–2.7)	2.2% (1.7–2.7)	2.2% (1.7–2.8)	2.0% (0.4–3.5)	1.7% (0.7–2.7)	0.9% (0.5–1.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 4.33
Past-30-Day Use of Substances to Stay Awake, by Gender

	Men	Women
Past-30-day use of energy drinks to stay awake		
Never	58.9%[a] (57.5–60.3)	72.3% (70.5–74.0)
1–2 times per week	28.7%[a] (27.3–30.0)	20.6% (19.0–22.2)
3 or more times per week	12.5%[a] (11.5–13.4)	7.1% (6.1–8.1)
Past-30-day use of other caffeinated beverages to stay awake		
Never[z]	27.9% (26.6–29.2)	27.8% (25.9–29.7)
1–2 times per week[z]	25.0% (23.7–26.3)	24.8% (23.1–26.4)
3 or more times per week[z]	47.1% (45.7–48.5)	47.4% (45.5–49.3)
Past-30-day use of OTC medications to stay awake		
Never[z]	96.9% (96.4–97.4)	97.1% (96.5–97.8)
1–2 times per week[z]	1.9% (1.5–2.3)	1.7% (1.3–2.2)
3 or more times per week[z]	1.2% (0.9–1.6)	1.1% (0.7–1.5)
Past-30-day use of prescription medications to stay awake		
Never[z]	97.2% (96.7–97.7)	96.7% (95.9–97.5)
1–2 times per week[z]	1.0% (0.7–1.3)	0.7% (0.4–1.0)
3 or more times per week	1.8%[a] (1.4–2.2)	2.6% (1.9–3.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Comparisons with the 2018 HRBS Active Component Sample

Table 4.34 presents comparisons of the key outcomes in this chapter between service members in the reserve and active components. Recall that RRs and ARRs greater than 1.0 indicate that the reserve component has higher prevalence rates than the active component, whereas RRs and ARRs below 1.0 indicate that the reserve component has lower prevalence rates than the active component. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Weight Status

- Significantly fewer reserve component service members were overweight compared with their active component peers (ARR = 0.96, CI: 0.92, 1.00); however, a significantly larger percentage was obese (ARR = 1.11, 1.02, 1.20). The results related to the HP2020 BMI goals mirrors those for obesity, with significantly more reserve component service members than those in the active component meeting the BMI criteria for obesity (ARR = 1.10, CI: 1.02, 1.20).

Physical Activity

- A significantly larger percentage of reserve component service members got less than 150 minutes of MPA per week than their active component peers (ARR = 1.13, CI: 1.08, 1.19); however, a significantly smaller percentage got higher levels of MPA (7 percent less for 150–299 minutes per week and 8 percent less for 300 or more minutes per week). The same pattern holds for VPA, where significantly more reserve component service members got fewer minutes of VPA (ARR = 1.14, CI: 1.10, 1.18), and smaller percentages got more minutes of VPA per week (15 percent fewer for 150 or more minutes per week). The results related to the HP2020 physical activity goals mirror these findings, with significantly fewer reserve component service members than those in the active component meeting the criteria for medium activity level (ARR = 0.91, CI: 0.89, 0.93) and vigorous (ARR = 0.89, CI: 0.86, 0.93) amounts of physical activity.
- A significantly larger percentage of reserve component service members engaged in muscle-strengthening exercises at last three days a week than active component service members (ARR = 1.27, CI: 1.19, 1.35), suggesting that more met the HP2020 goal for strength training (which is two or more times a week).

Screen Time

- Reserve component members spent significantly less time using a device with a screen outside of work or school than their active component peers (ARR = 1.19, CI: 1.04, 1.35 for less than one hour of screen time per day; differences in the other categories [1–4 hours, 5 or more hours per day] were not significant).

Table 4.34
Rates of Health Promotion and Disease Prevention Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Weight status (BMI)		
Obesity among those age 20+ (HP2020 goal)	1.26*** (1.17, 1.36)	1.10** (1.02, 1.20)
Normal weight among those age 20+ (HP2020 goal)	0.94** (0.90, 0.99)	1.02 (0.96, 1.08)
Underweight	0.87 (0.51, 1.49)	0.88 (0.43, 1.80)
Normal weight	0.95** (0.90, 0.99)	1.02 (0.96, 1.07)
Overweight	0.96** (0.93, 1.00)	0.96** (0.92, 1.00)
Obese	1.26*** (1.17, 1.36)	1.11** (1.02, 1.20)
Overweight or obese	1.03** (1.00, 1.06)	0.99 (0.97, 1.02)
Physical activity		
Medium activity level (150 min MPA or 75 min VPA; HP2020 goal)	0.94*** (0.92, 0.96)	0.91*** (0.89, 0.93)
High activity level (300 min MPA or 150 min VPA; HP2020 goal)	0.92*** (0.88, 0.95)	0.89*** (0.86, 0.93)
MPA		
<150 mins/week	1.08*** (1.04, 1.13)	1.13*** (1.08, 1.19)
150–299 mins/week	0.95** (0.91, 0.99)	0.93*** (0.89, 0.98)
300+ mins/week	0.96 (0.90, 1.03)	0.92** (0.85, 0.99)
VPA		
<75 mins/week	1.10*** (1.07, 1.14)	1.14*** (1.10, 1.18)
75–149 mins/week	0.93 (0.83, 1.04)	0.92 (0.81, 1.05)
150+ mins/week	0.87*** (0.84, 0.92)	0.85*** (0.80, 0.89)
Strength training		
Muscle-strengthening activities on 3+ days/week (HP2020 goal is 2+ days)	1.23*** (1.16, 1.29)	1.27*** (1.19, 1.35)
<1 day/week	0.87*** (0.84, 0.90)	0.88*** (0.84, 0.91)

Table 4.34—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
1–2 days/week	1.03 (0.97, 1.09)	0.99 (0.93, 1.06)
3+ days/week	1.23*** (1.16, 1.29)	1.27*** (1.19, 1.35)
Screen time		
< 1 hour per day	1.36*** (1.21, 1.53)	1.19*** (1.04, 1.35)
1–4 hours per day	0.98 (0.96, 1.00)	0.99 (0.96, 1.02)
5+ hours per day	0.97 (0.91, 1.03)	0.98 (0.92, 1.05)
Annual physical assessment	1.02 (1.00, 1.04)	1.00 (0.97, 1.03)
Sleep health		
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 goal)	1.36*** (1.31, 1.42)	1.41*** (1.35, 1.48)
Hours of sleep per 24-hour period		
≤ 4 hours	0.61*** (0.54, 0.69)	0.54*** (0.47, 0.61)
5–6 hours	0.85*** (0.82, 0.88)	0.84*** (0.81, 0.87)
7+ hours	1.33*** (1.28, 1.39)	1.40*** (1.33, 1.46)
Sleep quality		
Very good	1.71*** (1.56, 1.88)	1.76*** (1.58, 1.95)
Fairly good	1.07*** (1.04, 1.11)	1.10*** (1.06, 1.14)
Fairly bad	0.72*** (0.68, 0.76)	0.68*** (0.64, 0.73)
Very bad	0.64*** (0.54, 0.75)	0.60*** (0.50, 0.71)
Lack of energy due to poor sleep	0.69*** (0.65, 0.74)	0.66*** (0.62, 0.71)
Use of medications to sleep		
Never	1.04*** (1.03, 1.06)	1.07*** (1.05, 1.09)
Occasionally (less than once per week,1–2 times per week	0.87*** (0.79, 0.96)	0.83*** (0.74, 0.93)

Table 4.34—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Frequently (3 or more times per week)	0.75*** (0.67, 0.85)	0.59*** (0.52, 0.67)
Use of substances to stay awake		
Past-30-day use of energy drinks to stay awake		
Never	1.15*** (1.11, 1.18)	1.08*** (1.04, 1.11)
1–2 times per week	0.91*** (0.86, 0.96)	0.97 (0.91, 1.04)
3 or more times per week	0.69*** (0.63, 0.76)	0.77*** (0.70, 0.85)
Past-30-day use of other caffeinated beverages to stay awake		
Never	1.04 (0.98, 1.10)	1.00 (0.93, 1.06)
1–2 times per week	0.96 (0.91, 1.03)	1.02 (0.95, 1.09)
3 or more times per week	1.00 (0.96, 1.03)	0.99 (0.95, 1.03)
Past-30-day use of OTC medications to stay awake		
Never	1.01 (1.00, 1.01)	1.01* (1.00, 1.01)
1–2 times per week	0.77** (0.60, 0.99)	0.80 (0.61, 1.06)
3 or more times per week	1.04 (0.76, 1.41)	0.86 (0.61, 1.22)
Past-30-day use of prescription medications to stay awake		
Never	1.00 (0.99, 1.00)	1.00 (1.00, 1.01)
1–2 times per week	1.26 (0.84, 1.90)	1.02 (0.67, 1.56)
3 or more times per week	1.15 (0.89, 1.48)	0.85 (0.65, 1.12)

NOTES: RRs/ARRs above 1.0 indicate that the reserve component has an increased prevalence of the outcome in question compared with the active component; RRs/ARRs below 1.0 indicate that the reserve component has a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Annual Physical Assessment

- There was no significant difference in the percentage of reserve and active component service members who received a past-year physical assessment.

Sleep Health

- Significantly more reserve component service members than service members in the active component met the HP2020 goal for sufficient sleep (ARR = 1.41, CI: 1.35, 1.48). Similarly, significantly fewer got an average of less than four hours of sleep per night (ARR = 0.54, CI: 0.47, 0.61) and between five and six hours of sleep (ARR = 0.84, CI: 0.81, 0.87), but a significant larger percentage got an average of seven or more hours of sleep per night (ARR = 1.40, CI: 1.33, 1.46).
- A significantly larger percentage of reserve component service members than active component service members reported that their sleep quality was "very good" (ARR = 1.76, CI: 1.58, 1.95) or "fairly good" (ARR = 1.10, CI: 1.06, 1.14). Significantly fewer rated their sleep as "fairly bad" (ARR = 0.68, CI: 0.64, 0.73) or "very bad" (ARR = 0.60, CI: 0.50, 0.71).
- Significantly more reserve component service members than service members in the active component reported never using medications to help them sleep (ARR = 1.07, CI: 1.05, 1.09); similarly, fewer used such medications occasionally (up to 1–2 times per week, ARR = 0.83, CI: 0.74, 0.93) or frequently (three or more times per week, ARR = 0.59, CI: 0.52, 0.67).

Use of Substances to Stay Awake

- Past-30-day use of energy drinks to stay awake was significantly lower among reserve component service members than among active component service members; 8 percent more reported never using them (ARR = 1.08, CI: 1.04, 1.11), and 23 percent fewer reported using them three or more times per week (ARR = 0.70, CI: 0.77, 0.85).
- Past-30-day use of other caffeinated beverages and prescription medications to stay awake did not significantly differ across the two populations.
- Past-30-day use of OTC medications to stay awake was essentially the same for reserve and active component service members (ARR = 1.01, CI: 1.00, 1.01).

Summary

This chapter discussed a range of health promotion activities, all of which have the potential to contribute to the overall readiness of the force. Even though service members are required to have an annual routine physical, we found that less than three-quarters of reserve component respondents reported doing so (71.6 percent). Not having data from such exams can hinder the military's ability to track other health promotion markers, such as weight, physical fitness, chronic conditions, and sleep habits. Perhaps more concerning is that 8 percent of reserve component service members reported having no health insurance of any kind. Access to care

through insurance has shown to result in better health outcomes and better preventive care, both of which contribute to a healthy and ready fighting force.

The reserve component of the military is almost meeting the HP2020 goals for normal weight (31.4 percent report being classified as normal weight, and the HP2020 goal is 33.9 percent; Healthy People, 2020j) and exceeding the goal for obesity (19 percent report being classified as obese, and the HP2020 goal is less than 30.5 percent; Healthy People, 2020k). Being of normal weight is critical to mission readiness because not only can extra weight impact the ability of service members to perform their duties, but obesity is also often comorbid with diabetes, asthma, hypertension, and joint pain (Guh et al., 2009; National Institutes of Health, 1998; Heinrich et al., 2008; Army Public Health Center, 2015; Rush, LeardMann, and Crum-Cianflone, 2016).

One possible reason that the military is currently meeting HP2020 weight goals is the prevalence of physical activity among service members. Well over half of reserve component service members reported that they engaged in medium physical activity levels as defined by HP2020, meaning at least 150 minutes per week of MPA or at least 75 minutes per week of VPA (67.2 percent), and 41.6 percent met high physical activity guidelines, meaning more than 300 minutes per week of MPA or more than 150 minutes per week of VPA. Additionally, 43.1 percent of service members reported engaging in strength training at least three days per week. These results for moderate activity level, high activity level, and strength training all surpass the HP2020 goals for physical activity (Healthy People, 2020l; Healthy People, 2020m; Healthy People, 2020n). However, a statistically significant smaller portion of women engaged in all of these activities. Physical fitness is critical to being able to complete many of the tasks associated with personnel readiness (Army Public Health Center, 2015).

Time spent watching a screen, indicative of sedentary behavior, also has the potential to impact readiness, as higher levels of screen time are associated with obesity, mortality, cardiometabolic disease, and depression (Owen et al., 2010; Stamatakis, Hamer, and Dunstan, 2011; Madhav, Sherchand, and Sherchan, 2017; Thorp et al., 2011). We found that junior enlisted service members, who are also the youngest service members, were, on average, more likely to report engaging in five or more hours of screen time per day (31.5 percent).

We also found that sleep health is a major concern, and, like physical activity and sedentary behavior, sleep health can have serious implications for both mission readiness and performance. Lack of sleep or poor sleep is associated with adverse mental, physical, and cognitive functioning, including depression, anxiety, PTSD, traumatic brain injury (TBI), accidents, injuries, cardiovascular events, and mortality (Grandou et al., 2019; Kasasbeh, Chi, and Krishnaswamy, 2006; Knutson et al., 2006; Kredlow et al., 2015; Seelig et al., 2016). According to the survey data presented in this chapter, 45.4 percent of reserve component service members reported getting the recommended seven or more hours of sleep per night, one-quarter rated their sleep as very bad or fairly bad, and nearly 20 percent of respondents reported being severely or moderately bothered by a lack of sleep. Over one-third routinely (three or more times per week) used energy drinks to stay awake; however, fewer than 3 percent reported use of either OTC or prescription medications to do so.

In terms of comparisons between service members in the reserve and active components, we found that reserve members had higher rates of obesity and lower levels of physical activity, with the exception of strength training. Their sleep health, on the other hand, was better: They got more sleep per night, on average; rated their sleep quality more highly; and relied on fewer medications to both help them sleep and keep them awake.

CHAPTER FIVE

Substance Use

This chapter details self-reported substance use across the reserve component. We provide some background information and then present percentages of service members consuming alcohol in various patterns, using tobacco in a variety of forms, and using illicit and prescription drugs (including use as prescribed and misuse).

Each section highlights the importance or relevance of the substance use topic to the general population and to the military and then provides an analysis of each topic by service branch. When relevant, we present an analysis of each topic by pay grade and gender. Analyses by race/ethnicity and age group can be found in Appendix D. Key measures used are described in the applicable sections, and additional details about these measures can be found in Appendix C. All analyses demonstrated statistically significant omnibus tests (a Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless otherwise noted in the tables. Statistically significant group differences (pairwise comparisons) are presented within each table. However, only those statistically significant differences that the research team's subject-matter experts determined to be substantively meaningful (i.e., those that could be used to change or develop policy or contribute to inequalities in health outcomes across subgroups) are discussed in the text.

Where appropriate, the text compares reserve component members with civilian benchmarks (i.e., HP2020 goals) and/or current prevalence rates among U.S. adults; however, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest.

We also present comparisons between the active and reserve components on the key outcomes presented in this chapter. These comparative results use ARRs based on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARR can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20-percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matter for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind the base for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for

an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Alcohol

Most American adults have consumed alcohol during their lifetime, and more than half of Americans aged 12 and older have consumed alcohol at least once in the past month (Substance Abuse and Mental Health Services Administration, 2018). Heavy drinking is a leading preventable cause of death both in the United States and worldwide (Gore et al., 2011; Roerecke and Rehm, 2013) and has been linked to numerous problems, such as substance use disorders, occupational problems, relationship difficulties, and poor physical health and mental health (Abdul-Rahman et al., 2018; Kranzler and Soyka, 2018; Odlaug et al., 2016). Decades of research with military populations demonstrates that heavy alcohol use is also problematic in military populations, with both active-duty and separated military populations reporting high rates of alcohol use disorder and resulting negative consequences (Jones and Fear, 2011; Schumm and Chard, 2012; Servies et al., 2012; Teeters et al., 2017). Heavy drinking by military personnel has been linked to substance use disorders, poor health, limitations in role functioning (e.g., not being able to fulfill service requirements or perform job duties), mental health problems, aggressive and violent behaviors, and poor relationship functioning (Ames et al., 2008; Fink et al., 2016; Jacobson, Hooper, et al., 2008; Waller, McGuire, and Dobson, 2015).

Research examining data from the PDHA and the PDHRA indicates that Army soldiers in the reserve component reported similar rates of alcohol misuse to active-duty Army personnel: About 12 to 15 percent reported at least one positive response on a two-item alcohol misuse screener (Milliken, Auchterlonie, and Hoge, 2007). Other work has found similar rates of alcohol misuse among active-duty and reserve component members; for example, rates of binge drinking were 9 and 8 percent for active-duty and reserve component women in a midwestern community sample of more than 1,000 servicewomen (Cucciare et al., 2015). Rates of alcohol misuse three and six months postdeployment were higher for reserve component service members in the National Guard than for those in the active component (Thomas et al., 2010).

This section describes alcohol use among reserve component members, including the percentages of personnel who are binge drinkers and heavy drinkers. It also reports on consequences of drinking, including serious negative consequences from drinking, risky drinking and driving behavior, and alcohol-related productivity loss. Perceptions of the military drinking culture are also described. For each alcohol measure, we report prevalence overall and by service branch, pay grade, and gender; results by race/ethnicity and age group are available in Appendix D. Where available, we report on comparable percentages from the U.S. general population.

Binge Drinking and Heavy Drinking

Binge drinking was defined as consuming five or more drinks on the same occasion for men and consuming four or more drinks on the same occasion for women. Respondents who binge drank at least once in the past 30 days (i.e., at least five drinks on the same occasion at least once for men; at least four drinks on the same occasion at least once for women) were cat-

egorized as binge drinking in the past 30 days. This definition is consistent with the definition used in the 2018 National Survey on Drug Use and Health (NSDUH; Substance Abuse and Mental Health Services Administration, 2019a) and with the definition used in the 2015 HRBS (Meadows et al., 2018). *Heavy drinking* was defined by reporting binge drinking on at least one or two days a week in the past 30 days (i.e., approximately four or five occasions in the past 30 days). This definition is similar to the heavy drinking definition used by the NSDUH, which is binge drinking on five or more days in the past 30 days. The 2018 HRBS used a slightly lower threshold given the categorical response options presented to service members as compared with the actual number of days in the past 30 days a person engaged in binge drinking on the 2018 NSDUH. This discrepancy in response options should be considered when reviewing the findings comparing heavy drinking rates across the 2018 HRBS and the 2018 NSDUH (Substance Abuse and Mental Health Services Administration, 2019a). To provide another comparable estimate from the NSDUH, we obtained the data from the 2017 NSDUH (2018 data not available at the time of this publication) and calculated a variation of the heavy drinking definition: binge drinking on four or more occasions in the past 30 days. We include comparison with the 2018 estimates of heavy drinking and both the original 2017 NSDUH definition and our calculated variation definition.

Tables 5.1 through 5.3 present the percentages of reserve component members who met criteria for binge drinking and heavy drinking, overall and by service branch, pay grade, and gender. Key findings include the following:

- In the 2018 HRBS, 29.0 percent (95-percent CI: 27.9–30.1) of all reserve component service members reported binge drinking in the past 30 days (Table 5.1).
- In the most-recent comparable U.S. general population estimate of adults age 18 and above from the 2018 NSDUH, 26.5 percent of adults reported binge drinking in the past 30 days (Substance Abuse and Mental Health Services Administration, 2019c; Table 2.30B).
- The HP2020 target for binge drinking in the general population is for 24.2 percent of adults or less to engage in binge drinking (Healthy People, 2020o), which is well below the 2018 HRBS estimate for the reserve component.
- Across all services, 7.4 percent (95-percent CI: 6.8–8.1) of reserve component personnel reported heavy drinking in the past 30 days (Table 5.1). In the U.S. adult population in 2018, 6.6 percent reported heavy drinking in the past month (Substance Abuse and Mental Health Services Administration, 2019c; Table 2.31B); however, as noted, this is not a direct comparison due to variations in definitions between the 2018 HRBS and the 2018 NSDUH. Using the recalculated variation of the 2017 NSDUH heavy drinking rates, we found that 8.9 percent (CI: 8.4–9.3) of the U.S. adult population in 2017 reported heavy drinking.
- Binge drinking and heavy drinking varied by service branch. The Marine Corps Reserve reported the highest rates of binge drinking, with significantly greater rates compared to the Air Force Reserve, Air National Guard, Army Reserve, Army National Guard, and Navy Reserve. For heavy drinking, the Air Force Reserve and Air National Guard reported the lowest rates of heavy drinking, with significantly lower rates than the Army National Guard and Marine Corps Reserve. The Air Force Reserve also reported lower rates than the Army Reserve (Table 5.1).

Table 5.1
Alcohol Use in Past 30 Days, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Binge drinking	21.7%[d,e,g] (19.3–24.2)	24.9%[d,e] (23.0–26.8)	26.5%[d,e] (24.4–28.7)	31.8%[a,b,c,e] (29.8–33.8)	42.9%[a,b,c,d,f] (36.9–48.9)	27.1%[e] (24.0–30.2)	32.8%[a] (25.4–40.2)	27.6% (26.1–29.0)	30.1% (28.6–31.7)	29.0% (27.9–30.1)
Heavy drinking	3.9%[c,d,e] (2.9–5.0)	4.9%[d,e] (3.9–5.9)	6.9%[a] (5.7–8.1)	9.1%[a,b] (7.8–10.3)	9.6%[a,b] (6.1–13.1)	6.6% (4.9–8.3)	10.8% (3.7–17.8)	6.6% (5.8–7.5)	8.1% (7.1–9.1)	7.4% (6.8–8.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 5.2
Alcohol Use in Past 30 Days, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Binge drinking	29.2%[f] (27.1–31.3)	30.1%[f] (28.4–31.9)	27.4% (25.6–29.1)	28.2% (22.7–33.6)	30.4%[f] (27.4–33.4)	23.8%[a,b,e] (22.0–25.6)
Heavy drinking[z]	7.9% (6.6–9.1)	7.7% (6.6–8.8)	7.2% (6.1–8.3)	7.1% (4.0–10.1)	6.7% (4.9–8.4)	5.0% (4.1–6.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.3
Alcohol Use in Past 30 Days, by Gender

	Men	Women
Binge drinking	30.1%[a] (28.8–31.4)	24.5% (22.8–26.2)
Heavy drinking	8.0%[a] (7.2–8.8)	5.3% (4.3–6.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.
[a] Statistically significantly different from women's estimate.

- Binge drinking, but not heavy drinking, varied by pay grade. For binge drinking, senior officers (O4–O6) reported significantly lower rates of binge drinking than did junior enlisted personnel (E1–E4), noncommissioned officers (NCOs; E5–E6) and junior officers (O1–O3; Table 5.2).
- Both binge drinking and heavy drinking were more common among men than among women (Table 5.3).
- For race/ethnicity and age, there were differences between groups for binge drinking but not for heavy drinking (Appendix Tables D.23 and D.25). Non-Hispanic black personnel reported significantly lower rates of binge drinking than non-Hispanic white personnel and those from other races/ethnicities. For age, those under age 35 reported significantly higher rates of binge drinking than those in the older age groups (Appendix Table D.24).

Alcohol Consequences, Risky Drinking and Driving Behaviors, and Productivity Loss from Drinking

Tables 5.4 through 5.6 display the percentages of reserve component personnel overall and in various subgroups who reported any serious consequences from drinking, any risky drinking and driving behaviors, and any alcohol-related job productivity loss. *Any alcohol consequences* was defined as experience of any of ten assessed alcohol-related consequences: finding it harder

Table 5.4
Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any alcohol consequences	2.9%[d,e] (1.9–3.9)	3.0%[d,e] (2.3–3.7)	4.2% (3.1–5.2)	5.7%[a,b] (4.7–6.7)	7.2%[a,b] (4.0–10.4)	5.1% (3.4–6.9)	2.3% (0.7–4.0)	4.4% (3.7–5.1)	5.1% (4.3–5.9)	4.8% (4.2–5.3)
Risky drinking and driving behavior	2.4% [b,c,d,e,f] (1.6–3.1)	4.2% [a,d] (3.3–5.1)	4.4% [a,d] (3.5–5.4)	8.4% [a,b,c] (7.2–9.6)	7.5%[a] (4.4–10.6)	5.5%[a] (3.9–7.1)	5.5% (2.8–8.3)	4.5% (3.9–5.2)	7.4% (6.4–8.4)	6.1% (5.5–6.7)
Any productivity loss from drinking	2.2% [c,d,e,f] (1.5–2.9)	3.4%[d,e,f] (2.6–4.2)	3.9%[a,d,e] (3.1–4.8)	6.8%[a,b,c] (5.6–7.9)	9.8%[a,b,c] (6.2–13.5)	6.0%[a,b] (4.3–7.7)	4.4% (1.9–6.8)	4.6% (3.9–5.3)	6.0% (5.1–6.9)	5.3% (4.8–5.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 5.5
Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any alcohol consequences	5.5%[c,f] (4.4–6.5)	5.3%[c,f] (4.4–6.1)	2.4%[a,b,e] (1.8–3.1)	3.0% (1.0–5.0)	4.6%[c] (3.1–6.0)	2.6%[a,b] (1.9–3.3)
Risky drinking and driving behavior[z]	6.3% (5.1–7.5)	6.7% (5.7–7.7)	5.3% (4.4–6.2)	5.0% (2.4–7.6)	5.7% (4.2–7.3)	4.1% (3.3–4.9)
Any productivity loss from drinking[z]	5.3% (4.2–6.4)	5.7% (4.8–6.7)	4.0% (3.2–4.8)	4.5% (1.2–7.8)	7.0% (5.3–8.8)	4.4% (3.5–5.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.6
Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Gender

	Men	Women
Any alcohol consequences[z]	4.6% (4.0–5.3)	5.2% (4.3–6.2)
Risky drinking and driving behavior[z]	6.1% (5.4–6.9)	6.0% (5.1–6.8)
Any productivity loss from drinking[z]	5.5% (4.8–6.2)	4.8% (3.9–5.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

to handle problems because of drinking, receiving military punishment because of drinking, being arrested because of drinking (not driving related), getting a lower score on an efficiency or performance report due to drinking, hitting a spouse or significant other after drinking, getting into a fight when drinking, engaging in regretted sexual activity, being arrested for driving under the influence of alcohol, being hurt in an accident because of drinking, or causing an accident because of drinking. This measure is not directly comparable to the 2015 HRBS (Meadows et al., 2018) because the consequences assessed were modified. *Any risky drinking and driving* was defined as engaging in past-year driving behavior when either the service member was driving and had too much to drink or when the service member was the passenger while someone else who had too much to drink was driving a car or other vehicle. This measure is also not directly comparable to the 2015 HRBS. *Any productivity loss from drinking* was defined in the same way as it was on the 2015 HRBS and therefore is comparable

across surveys. Productivity was assessed with six items: getting hurt on the job due to drinking, being late for work or leaving work early because of drinking (including a hangover or illness caused by drinking), not coming to work at all due to drinking (including a hangover or illness or accident caused by drinking), working at a lower performance level due to drinking, being drunk while working, and reporting to work drunk after being off duty. Key findings from all reserve component respondents include the following:

- In the 2018 HRBS, 4.8 percent (95-percent CI: 4.2–5.3) of reserve component service members experienced one or more serious consequences from drinking (Table 5.4).
- The percentage of personnel reporting any risky drinking and driving behavior in the past year was 6.1 percent (95-percent CI: 5.5–6.7; Table 5.4).
- Across the services, 5.3 percent (95-percent CI: 4.8–5.9) reported work-related productivity loss from alcohol use (Table 5.4).
- For all three of these negative outcomes associated with drinking, significant differences emerged between the services (Table 5.4). The Marine Corps Reserve and the Army National Guard reported significantly higher rates of alcohol consequences than the Air Force Reserve and the Air National Guard. For risky drinking and driving behavior, the Air Force Reserve had the lowest rates, with significantly less risky drinking and driving compared with all other services except the Coast Guard Reserve. The rates of productivity loss among both the Marine Corps Reserve and the Army National Guard were significantly higher than the Air Force Reserve, the Air National Guard, and the Army Reserve. The Navy Reserve was also significantly higher than the Air Force Reserve and the Air National Guard.
- Junior enlisted personnel (E1–E4) and NCOs (E5–E6) experienced the highest rates of any serious alcohol consequences, with significantly higher rates than senior enlisted personnel (E7–E9) and senior officers (O4–O6; Table 5.5). Junior officers (O1–O3) also reported significantly higher rates than senior enlisted personnel (E7–E9). There were no significant differences in the rates of risky drinking and driving and the rates of productivity loss across the pay grades.
- There were no significant gender differences for all three of the negative outcomes associated with drinking (Table 5.6).
- For race/ethnicity, there were few significant differences between groups for the negative outcomes associated with drinking. Non-Hispanic Asian service members reported significantly lower rates of risky drinking and driving behavior and lower rates of productivity loss compared with non-Hispanic white service members and personnel of other races/ethnicities (Appendix Table D.25). For age, it was generally the case that those under age 35 reported higher rates of negative outcomes than those in the older age groups (Appendix Table D.26).

Military Drinking Culture

Tables 5.7 through 5.9 display reserve component service members' perceptions of military alcohol culture. *Military culture supportive of drinking* was defined as agreement with at least one of four statements related to finding it hard to "fit in" with one's command if they did not drink, belief that drinking is part of being in one's unit, belief that everyone is encouraged to drink at social events, and belief that leaders are tolerant of drunkenness when personnel

Table 5.7
Perception of Military Drinking Culture, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Military culture supportive of drinking	15.4%[b,d,e,g] (13.6–17.3)	20.3%[a,c,f,g] (18.5–22.1)	15.9%[b,d,e,g] (14.1–17.7)	24.1%[a,c,f,g] (22.3–25.9)	27.0%[a,c,f,g] (21.2–32.9)	14.4%[b,d,e,g] (11.9–16.9)	7.4%[a,b,c,d,e,f] (4.5–10.4)	16.6% (15.3–17.9)	23.2% (21.7–24.7)	20.2% (19.2–21.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 5.8
Perception of Military Drinking Culture, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Military culture supportive of drinking	22.8%[b,c,f] (20.8–24.7)	19.3%[a,c,f] (17.8–20.7)	15.2%[a,b,e] (13.8–16.6)	14.6%[e] (10.0–19.2)	23.6%[c,d,f] (20.5–26.7)	14.6%[a,b,e] (13.0–16.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 5.9
Perception of Military Drinking Culture, by Gender

	Men	Women
Military culture supportive of drinking[z]	20.4% (19.2–21.6)	19.6% (18.1–21.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

are off duty. This scale is not directly comparable to the 2015 HRBS (Meadows et al., 2018) because the items and response scale were modified. Key findings include the following:

- About one-fifth (20.2 percent, 95-percent CI: 19.2–21.2) of all reserve component service members agreed with at least one of the statements that military culture was supportive of drinking (Table 5.7).
- Agreement that military culture was supportive of drinking varied by service branch (Table 5.7). Perceptions of military culture as supportive of drinking were most common among the Marine Corps Reserve and the Army National Guard, who agreed with the statements at significantly higher rates than the Air Force Reserve, the Army Reserve, the Navy Reserve, and the Coast Guard Reserve. The Coast Guard Reserve reported significantly lower rates than all other branches.
- Junior enlisted service members (E1–E4) and junior officers (O1–O3) were the most likely to see military culture as supportive of drinking (Table 5.8). Junior enlisted personnel reported significantly higher rates than NCOs (E5–E6), senior enlisted (E7–E9), and senior officers (O4–O6). Junior officers reported significantly higher rates than senior enlisted personnel (E7–E9), warrant officers (W1–W5), and senior officers (O4–O6).
- There were no significant gender differences for perceptions of military culture as supportive of drinking (Table 5.9).
- Non-Hispanic white service members reported a higher rate of agreement that military culture was supportive of drinking than did non-Hispanic black, Hispanic, and non-

Hispanic Asian service members (Appendix Table D.27). Younger reserve component members were substantially more likely to see the military culture as supportive of drinking (Appendix Table D.28).

Tobacco

Tobacco use is the largest cause of preventable disease and death in the United States (National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health, 2014). Although rates of smoking have declined over the past decades, smoking remains the cause of 87 percent of lung cancer deaths, one-third of cancer deaths, and more than three-quarters of the cases of chronic obstructive pulmonary disease (COPD; National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health, 2014; Wang et al., 2018). Smoking also has an adverse effect on overall health and quality of life, and the Surgeon General has called for the elimination of the use of combustible tobacco products (National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health, 2014). Though use of smokeless tobacco generally receives less attention, it has also been associated with increased risk of cancer and stroke (Sinha et al., 2018), and use of smokeless tobacco is more common among military service members (Peterson, Severson, et al., 2007). Secondhand smoke presents concerns as well, including heart disease and lung cancer (Barnoya and Glantz, 2005; Kim, Ko, et al., 2018). Traditional tobacco products are not the only concern. The use of e-cigarettes has increased rapidly in the past several years, and although the long-term risks are unknown, there is mounting evidence that their use may increase risk of cardiovascular and lung disease (Glantz and Bareham, 2018). E-cigarette use is also most common among young adults (Schoenborn and Gindi, 2015), who make up a large proportion of the reserve component.

This section presents data on current (past-30-day) use of cigarettes, e-cigarettes, cigars, smokeless tobacco, pipes, and hookahs. We present information on differences in prevalence by service branch and other demographic groups. We also present data on smoking cessation attempts. Given the increasing use of e-cigarettes (Glantz and Bareham, 2018), we also provide data regarding reasons for use of e-cigarettes.

Cigarette, E-Cigarette, Cigar, and Smokeless Tobacco Use

Tables 5.10 through 5.12 show the percentages of reserve component service members who currently smoke cigarettes, e-cigarettes, or cigars; use a pipe or hookah to smoke tobacco; and use smokeless tobacco. Key findings include the following:

- Across all services, 13.3 percent (95-percent CI: 12.5–14.2) of service members were current cigarette smokers (Table 5.10). HP2020 set a target of 12.0 percent for cigarette smoking among U.S. adults (Healthy People, 2020s); in 2017, 14.1 percent of U.S. adults reported currently smoking cigarettes (CDC, 2018b).
- An estimated 9.9 percent (95-percent CI: 9.1–10.7) of service members currently smoke e-cigarettes (Table 5.10). Although HP2020 has not set a target for use of e-cigarettes, data from the 2017 Behavioral Risk Factor Surveillance System (BRFSS) suggests that 4.6 percent of U.S. adults are current e-cigarette smokers (CDC, 2017). This suggests that e-cigarette use is higher among reserve component service members than among the general population.

Table 5.10
Current Tobacco Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Current cigarette smoking	7.7%[c,d,e] (6.2–9.2)	8.8%[c,d] (7.5–10.1)	14.0%[a,b] (12.2–15.7)	16.1%[a,b,f] (14.5–17.8)	13.8%[a] (9.7–18.0)	10.2%[d] (8.0–12.3)	7.7% (3.8–11.6)	12.1% (10.9–13.2)	14.4% (13.1–15.7)	13.3% (12.5–14.2)
Current e-cigarette use	5.9%[c,d,e] (4.5–7.3)	8.0%[d,e] (6.7–9.2)	9.4%[a] (7.8–11.0)	11.6%[a,b] (10.0–13.1)	14.1%[a,b,g] (9.9–18.4)	8.3% (6.0–10.5)	3.7%[e] (0.7–6.7)	8.9% (7.9–10.0)	10.7% (9.5–11.9)	9.9% (9.1–10.7)
Current cigar smoking	4.6%[b,d,e] (3.5–5.7)	7.3%[a] (6.1–8.6)	7.2% (6.0–8.5)	9.2%[a] (7.9–10.6)	10.1%[a] (6.4–13.8)	7.9% (5.8–10.0)	5.5% (2.4–8.5)	7.1% (6.2–8.0)	8.8% (7.7–9.9)	8.0% (7.3–8.7)
Current smokeless tobacco use	4.8%[b,c,d,e] (3.5–6.1)	9.3%[a,d,e] (8.0–10.7)	8.9%[a,d,e] (7.3–10.4)	14.3%[a,b,c,f] (12.8–15.9)	15.8%[a,b,c,f] (11.5–20.1)	5.7%[d,e] (3.9–7.5)	8.4% (4.2–12.5)	8.3% (7.3–9.3)	13.1% (11.9–14.4)	11.0% (10.1–11.8)
Current pipe or hookah smoker[z]	2.6% (1.0–4.2)	2.0% (1.3–2.7)	3.5% (2.6–4.5)	3.1% (2.3–4.0)	5.2% (2.4–7.9)	2.4% (1.3–3.5)	2.9% (0.5–5.3)	3.3% (2.6–4.0)	2.9% (2.2–3.5)	3.1% (2.6–3.5)
Any current tobacco or nicotine use[1]	19.0%[b,c,d,e] (16.6–21.5)	25.0%[a,d,e] (23.0–26.9)	29.2%[a,d,g] (26.9–31.5)	35.9%[a,b,c,f,g] (33.8–38.0)	36.3%[a,b,f,g] (30.5–42.2)	24.6%[d,e] (21.4–27.8)	17.8%[c,d,e] (12.6–23.0)	27.1% (25.6–28.6)	33.3% (31.6–34.9)	30.5% (29.3–31.6)
Any current tobacco or nicotine smoking[2]	15.5%[c,d,e,f] (13.2–17.8)	19.4%[c,d,e] (17.6–21.2)	24.5%[a,b,g] (22.3–26.7)	28.2%[a,b,f,g] (26.2–30.2)	30.7%[a,b,f,g] (25.1–36.3)	21.4%[a,d,e] (18.3–24.4)	13.6%[c,d,e] (8.9–18.3)	22.8% (21.3–24.2)	26.1% (24.5–27.7)	24.6% (23.5–25.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] Includes cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco.

[2] Includes cigarettes, e-cigarettes, cigars, pipes, and hookahs; excludes smokeless tobacco.

Table 5.11
Current Tobacco Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Current cigarette smoking	15.1%[c,d,e,f] (13.4–16.8)	16.2%[c,d,e,f] (14.8–17.7)	11.6%[a,b,e,f] (10.3–12.9)	7.6%[a,b,f] (4.4–10.7)	5.5%[a,b,c,f] (4.0–7.0)	3.1%[a,b,c,d,e] (2.4–3.9)
Current e-cigarette use	15.6%[b,c,d,e,f] (13.8–17.3)	7.8%[a,c,e,f] (6.8–8.9)	4.8%[a,b,f] (3.9–5.6)	4.6%[a,f] (1.8–7.4)	3.6%[a,b,f] (2.3–4.8)	1.4%[a,b,c,d,e] (0.9–2.0)
Current cigar smoking	9.0%[c] (7.6–10.4)	7.4% (6.4–8.5)	6.5%[a] (5.5–7.5)	9.3% (5.3–13.2)	7.4% (5.5–9.3)	7.6% (6.4–8.7)
Current smokeless tobacco use	11.0%[f] (9.5–12.6)	12.4%[f] (11.1–13.7)	11.7%[f] (10.4–13.0)	8.4% (5.0–11.8)	9.2%[f] (7.3–11.1)	5.8%[a,b,c,e] (4.8–6.9)
Current pipe or hookah smoker	4.3%[b,c,f] (3.2–5.3)	2.5%[a] (1.9–3.1)	1.9%[a] (1.3–2.5)	1.9% (0.1–3.8)	2.5% (1.5–3.5)	1.4%[a] (0.8–2.1)
Any current tobacco or nicotine use[1]	34.0%[c,e,f] (31.8–36.3)	32.5%[c,e,f] (30.7–34.3)	28.4%[a,b,e,f] (26.7–30.2)	25.4%[f] (19.9–30.8)	20.6%[a,b,c,f] (17.9–23.3)	16.0%[a,b,c,d,e] (14.4–17.6)
Any current tobacco or nicotine smoking[2]	29.4%[c,d,e,f] (27.2–31.5)	25.6%[c,e,f] (23.9–27.2)	19.8%[a,b,e,f] (18.3–21.4)	19.7%[a,f] (14.5–24.8)	15.0%[a,b,c] (12.5–17.4)	11.5%[a,b,c,d] (10.1–12.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[1] Includes cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco.

[2] Includes cigarettes, e-cigarettes, cigars, pipes, and hookahs; excludes smokeless tobacco.

- In 2018, 8.0 percent (95-percent CI: 7.3–8.7) of service members were current cigar smokers (Table 5.10). HP2020 set a target of 0.3 percent for use of cigars (Healthy People, 2020u), and 3.8 percent of U.S. adults currently smoke cigars (Wang et al., 2018). This suggests that the rate of cigar use is higher among reserve component service members than among the general public and exceeds the HP2020 target. In addition, 3.1 percent (95-percent CI: 2.6–3.5) of service members in the 2018 HRBS reported smoking pipes or hookahs (Table 5.10). Though HP2020 has not established a target for smoking pipes or hookahs, data from the National Health Interview Survey (NHIS) indicate that approximately 1.0 percent of U.S. adults currently use a pipe or hookah to smoke tobacco (Wang et al., 2018).
- An estimated 11.0 percent (95-percent CI: 10.1–11.8) of service members currently use smokeless tobacco (Table 5.10). HP2020 set a target of 0.2 percent for use of smokeless tobacco among adults (Healthy People, 2020t); in 2017, 2.1 percent of adults reported currently using smokeless tobacco (Wang et al., 2018). This suggests a higher rate of smokeless tobacco use within the reserve component than is observed in the general population.
- In total, 30.5 percent (95-percent CI: 29.3–31.6) of reserve component service members were current users of any of the tobacco/nicotine products assessed in the 2018 HRBS (i.e., cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco). NHIS data suggest that the rate in the general population is 19.3 percent. Though these rates are

Table 5.12
Current Tobacco Use, by Gender

	Men	Women
Current cigarette smoking	14.0%[a] (12.9–15.0)	10.9% (9.7–12.2)
Current e-cigarette use[z]	9.9% (8.9–10.8)	10.0% (8.7–11.4)
Current cigar smoking	9.0%[a] (8.2–9.9)	4.2% (3.2–5.1)
Current smokeless tobacco use	13.3%[a] (12.3–14.3)	1.8% (1.1–2.4)
Current pipe or hookah smoker[z]	3.2% (2.6–3.8)	2.6% (1.9–3.2)
Any current tobacco or nicotine use[1]	33.0%[a] (31.6–34.3)	20.8% (19.1–22.4)
Any current tobacco or nicotine smoking[2]	25.8%[a] (24.5–27.1)	20.0% (18.3–21.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] Includes cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco.

[2] Includes cigarettes, e-cigarettes, cigars, pipes, and hookahs; excludes smokeless tobacco.

not directly comparable due to differences in methodology and population, data suggest higher rates of tobacco use among service members.

Some differences by pay grade and demographic characteristics emerged. Key findings include the following:

- Junior and midcareer enlisted service members had significantly higher rates of current cigarette smoking than the other groups, and junior enlisted service members reported the highest rates of e-cigarette use, with rates of use nearly double the rates for the next-highest group (E5–E6; Table 5.11).
- Senior officers were significantly less likely than others to be current cigarette smokers, e-cigarette users, and smokeless tobacco users. Senior officers also had the lowest rates of any current tobacco or nicotine use (16.0 percent; 95-percent CI: 14.4–17.6; Table 5.11).
- Men had significantly higher rates of cigarette smoking, cigar smoking, and smokeless tobacco use. They were more likely to be current tobacco or nicotine users (33.0 percent; 95-percent CI: 31.6–34.3) than women (20.8 percent; 95-percent CI: 19.1–22.4; Table 5.12).
- There were few significant differences by race/ethnicity; however, non-Hispanic white service members had significantly higher rates of current tobacco or nicotine use than

non-Hispanic black, Hispanic, and non-Hispanic Asian service members (Appendix Table 29).
- Service members age 45 and up had significantly lower rates of cigarette smoking, e-cigarette use, and pipe or hookah smoking than all other age groups. They were also significantly less likely to be current tobacco or nicotine users (Appendix Table D.30).

Smoking Cessation

In the 2018 HRBS, 45.5 percent (95-percent CI: 41.9–49.1) of current smokers attempted to quit smoking (see Tables 5.13 through 5.15). There were no significant differences with respect to service branch or pay grade (Tables 5.13, 5.14). However, significantly fewer men than women attempted to quit smoking in the past year (Table 5.15).

Reasons for Use of E-Cigarettes

As e-cigarettes have become more prevalent, there has been increasing interest in understanding the factors that contribute to their use. The 2018 HRBS explored three potential reasons that service members use e-cigarettes. Key findings include the following:

- Among current e-cigarette users, 30.8 percent (95-percent CI: 27.1–34.5) reported that they used e-cigarettes because they were healthier than smoking cigarettes (Table 5.16). There were no significant differences in this reason by service branch or pay grade (Tables 5.16, 5.17). However, men were more likely to endorse this statement than women (Table 5.18).
- An estimated 33.1 percent (95-percent CI: 29.5–36.7) reported using e-cigarettes to help them quit smoking cigarettes (Table 5.16). This was more common among midcareer and senior enlisted service members than among junior enlisted personnel (Table 5.17). There were no significant differences by service branch or gender (Tables 5.16, 5.18). However, service members age 17–24 were significantly less likely to endorse this as a reason for e-cigarette use (22.5 percent; 95-percent CI: 17.1–27.9) than service members in all other age groups (Appendix Table D.34).
- An estimated 24.0 percent (95-percent CI: 20.7–27.3) of reserve component service members reported using e-cigarettes because they could be used in places where cigarette smoking was not allowed. There were no differences with respect to service branch, pay grade, or gender (Tables 5.16, 5.17, 5.18).

A study of e-cigarette use in U.S. adults found that 30 percent used them to quit or cut back on smoking, 29 percent believed them to be less harmful than smoking cigarettes, and 23 percent tried them because they could be used in places where smoking was not allowed (Pepper et al., 2014). These data suggest that reserve component service members are using e-cigarettes for similar reasons.

Table 5.13
Past-Year Smoking Cessation Attempts Among Current Smokers, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Attempted to quit smoking[z]	44.4% (34.1–54.6)	41.4% (34.0–48.9)	45.4% (38.7–52.1)	48.0% (42.3–53.7)	NR (26.3–57.5)	35.6% (25.6–45.7)	NR (7.1–42.7)	43.3% (38.4–48.2)	47.0% (42.0–52.0)	45.5% (41.9–49.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

NR = Not reportable.

Table 5.14
Past-Year Smoking Cessation Attempts Among Current Smokers, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Attempted to quit smoking[z]	47.6% (41.3–54.0)	43.3% (38.6–48.1)	46.8% (40.9–52.6)	NR (9.0–42.0)	42.2% (28.5–55.9)	43.4% (31.1–55.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.15
Past-Year Smoking Cessation Attempts Among Current Smokers, by Gender

	Men	Women
Attempted to quit smoking	44.2%[a] (40.1–48.3)	52.2% (46.2–58.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Table 5.16
Reasons for E-Cigarette Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Perceived to be healthier than smoking cigarettes[z]	26.7% (16.9–36.5)	33.1% (26.0–40.2)	35.2% (27.4–43.0)	29.5% (23.4–35.6)	23.5% (11.8–35.3)	34.7% (22.3–47.1)	NR (NR)	31.6% (26.4–36.8)	30.2% (25.0–35.3)	30.8% (27.1–34.5)
Used to help quit smoking cigarettes[z]	31.8% (21.9–41.8)	32.7% (25.7–39.6)	39.0% (31.0–47.0)	32.2% (26.4–38.0)	27.6% (15.4–39.7)	27.6% (17.6–37.6)	NR (NR)	34.3% (29.0–39.6)	32.3% (27.4–37.2)	33.1% (29.5–36.7)
Able to use in places where cigarette smoking is not allowed[z]	19.4% (10.3–28.6)	18.9% (13.6–24.3)	29.2% (22.1–36.4)	24.0% (18.5–29.4)	17.3% (7.2–27.5)	27.2% (16.1–38.4)	NR (NR)	25.4% (20.7–30.1)	23.0% (18.5–27.5)	24.0% (20.7–27.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.17
Reasons for E-Cigarette Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Perceived to be healthier than smoking cigarettes[z]	29.7% (24.6–34.9)	32.8% (27.2–38.4)	33.5% (25.4–41.6)	NR (5.7–60.7)	31.3% (17.3–45.2)	NR (13.8–46.6)
Used to help quit smoking cigarettes	27.8%[b,c] (22.9–32.7)	42.3%[a] (36.4–48.2)	51.4%[a] (42.6–60.1)	NR (35.2–83.4)	33.4% (19.4–47.5)	NR (19.8–53.1)
Able to use in places where cigarette smoking is not allowed[z]	23.0% (18.5–27.5)	27.0% (21.7–32.2)	18.1% (11.9–24.3)	NR (0.3–34.0)	32.1% (17.8–46.5)	22.0% (9.3–34.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.18
Reasons for E-Cigarette Use, by Gender

	Men	Women
Perceived to be healthier than smoking cigarettes	32.7%[a] (28.3–37.1)	23.3% (17.6–29.0)
Used to help quit smoking cigarettes[z]	33.2% (29.0–37.5)	32.6% (26.1–39.0)
Able to use in places where cigarette smoking is not allowed[z]	24.8% (20.8–28.7)	20.9% (15.8–26.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Marijuana Use and Drug Use

This section describes both past-12-month and past-30-day use among all service members in the reserve components for several types of drugs: marijuana (cannabis, hashish), synthetic cannabis, inhalants to get high, synthetic stimulants, nonprescription cough or cold medicine, nonprescription anabolic steroids, and drugs other than marijuana and synthetic cannabis (cocaine [including crack], lysergic acid diethylamide [LSD], phencyclidine [PCP], 3,4-methylenedioxy-methamphetamine [MDMA, commonly called ecstasy], methamphetamine, heroin, and gamma hydroxybutyrate [GHB]). We separated out drug categories to make these comparable to the 2018 HRBS for the active component, and at the end of this section we compare the active and reserve components on drug outcomes. Thus, *use of drugs in the past 12 months* was defined by endorsement of any of the following five categories of drugs in the past year: marijuana, synthetic cannabis, inhalants to get high, synthetic stimulants, and "other illegal drugs." *Use of drugs in the past 30 days* was defined by endorsement of any of these five categories of drugs in the past 30 days. *Any cough or cold medicine use in the past 12 months* was defined as any use of nonprescription cough or cold medicine to get high in the past year. *Any steroid use in the past 12 months* was defined as any use of nonprescription anabolic steroids in the past year. There were very few reserve component service members who reported nonprescription cough or cold medicine use in the past 30 days (n = 19) and even fewer service members who reported nonprescription anabolic steroid use in the past 30 days (n = 8), which precluded us from making meaningful comparisons across service branches, pay grade, gender, age, and race/ethnicity. Thus, these past-30-day use rates were not included in the tables. In addition, only eight reserve component service members reported past-12-month anabolic steroid use. These low prevalence rates made statistical models difficult to run, and, therefore, nonprescription anabolic steroid use was not included in this report.

Given the higher prevalence rates of marijuana use in the general population as compared with use of other drugs (Substance Abuse and Mental Health Services Administration, 2019a), we then separated out marijuana and synthetic cannabis in the past 12 months and past-12-month drug use other than marijuana and synthetic cannabis (i.e., inhalants, synthetic stimulants, and other illegal drugs), as well as marijuana and synthetic cannabis use in the past 30 days and past-30-day drug use other than marijuana and synthetic cannabis. Marijuana and synthetic cannabis use in the past 12 months and past 30 days were not directly comparable to the 2018 NSDUH due to the NSDUH not including synthetic cannabis (Substance Abuse and Mental Health Services Administration, 2019a). Similarly, nonmarijuana/synthetic cannabis drug use for both the past 12 months and the past 30 days was not directly comparable with the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a).

Any Drug Use in the Past 12 Months

Tables 5.19 through 5.21 detail past-12-month use of drugs. Key findings for any drug use (i.e., any use of marijuana, synthetic cannabis, inhalants, synthetic stimulants, and "other illegal drugs") include the following:

- In the 2018 HRBS, 2.7 percent (95-percent CI: 2.2–3.2) of reserve component service members reported use of any drugs in the past year (Table 5.19).

Table 5.19
Past-Year Drug Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any past-12-month drug use	0.2%[c,d,e,f] (0.03–0.4)	0.6%[c,d,e] (0.3–1.0)	1.8%[a,b,d] (1.1–2.5)	4.6%[a,b,c,f] (3.5–5.7)	3.0%[a,b] (0.7–5.2)	1.5%[a,d] (0.5–2.5)	1.0% (0.0–2.4)	1.6% (1.1–2.0)	3.7% (2.8–4.5)	2.7% (2.2–3.2)
Any past-12-month use of nonprescription cough or cold medicine to get high[z]	0.1% (0.0–0.3)	0.2% (0.1–0.4)	0.3% (0.1–0.4)	0.6% (0.3–1.0)	0.4% (0.0–1.2)	0.4% (0.1–0.7)	0.0% (0.0–1.6)	0.3% (0.1–0.4)	0.5% (0.3–0.8)	0.4% (0.3–0.6)
Any past-12-month marijuana or synthetic cannabis use	0.2%[c,d,e] (0.03–0.4)	0.5%[c,d,e] (0.2–0.8)	1.7%[a,b,d] (1.1–2.4)	4.3%[a,b,c,f] (3.2–5.3)	3.0%[a,b] (0.7–5.2)	0.8%[d] (0.2–1.4)	0.5% (0.0–1.5)	1.4% (1.0–1.8)	3.4% (2.5–4.2)	2.5% (2.0–3.0)
Any past-12-month drug use, excluding marijuana and synthetic cannabis	0.04%[d] (0.0–0.1)	0.2%[d] (0.0–0.4)	0.2%[d] (0.03–0.4)	1.2%[a,b,c] (0.5–1.8)	0.8% (0.0–1.8)	0.8% (0.003–1.6)	0.5% (0.0–1.4)	0.4% (0.1–0.6)	0.9% (0.5–1.4)	0.7% (0.4–1.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.20
Past-Year Drug Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any past-12-month drug use	4.2%[b,c,e,f] (3.1–5.3)	2.3%[a,c,f] (1.7–2.9)	0.6%[a,b] (0.3–0.9)	2.2%[f] (0.0–4.4)	1.5%[a,f] (0.6–2.4)	0.2%[a,b,d,e] (0.0–0.5)
Any past-12-month use of nonprescription cough or cold medicine to get high[z]	0.3% (0.0–0.5)	0.5% (0.2–0.8)	0.6% (0.3–0.8)	0.2% (0.0–0.4)	0.6% (0.0–1.7)	0.4% (0.2–0.7)
Any past-12-month marijuana or synthetic cannabis use	3.9%[b,c,e,f] (2.9–5.0)	2.1%[a,c,f] (1.5–2.7)	0.5%[a,b] (0.2–0.7)	2.2%[f] (0.0–4.4)	1.2%[a] (0.5–1.9)	0.2%[a,b,d] (0.0–0.4)
Any past-12-month drug use, excluding marijuana and synthetic cannabis	1.0%[c] (0.4–1.6)	0.5% (0.2–0.8)	0.1%[a] (0.0–0.3)	0.6% (0.0–1.8)	0.6% (0.0–1.3)	0.2% (0.0–0.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.21
Past-Year Drug Use, by Gender

	Men	Women
Any past-12-month drug use[z]	2.8% (2.2–3.4)	2.5% (1.7–3.4)
Any past-12-month use of nonprescription cough or cold medicine to get high[z]	0.4% (0.2–0.6)	0.4% (0.2–0.6)
Any past-12-month marijuana or synthetic cannabis use[z]	2.5% (1.9–3.1)	2.3% (1.5–3.2)
Any past-12-month drug use excluding marijuana and synthetic cannabis[z]	0.7% (0.4–1.1)	0.4% (0.2–0.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- The Army National Guard reported the highest rate of any past-12-month drug use (Table 5.19), with rates significantly higher than the Air Force Reserve, Air National Guard, Army Reserve, and Navy Reserve.
- Senior officers (O4–O6) and senior enlisted personnel (E7–E9) reported the lowest rates of past-12-month drug use (Table 5.20), with senior enlisted personnel reporting significantly lower rates than junior enlisted personnel (E1–E4) and NCOs (E5–E6) and senior officers reporting significantly lower rates than junior officers (O1–O3), junior enlisted personnel, NCOs, and warrant officers (W1–W5).
- Men and women reported similar rates of drug use in the past 12 months (Table 5.21).
- There were no differences between reserve component service members of different race/ethnicities (Appendix Table D.35). For age, younger reserve component service members reported greater rates of any drug use than older service members (Appendix Table D.36).

Past-12-Month Use of Nonprescription Cough or Cold Medicine

Tables 5.19 through 5.21 detail past-12-month use of nonprescription cough or cold medicine to get high. The number of total reserve component service members reporting use of nonprescription anabolic steroids was very low (i.e., only nine total reported past-year use), which made any comparison across subgroups difficult. Because of these low results, we did not include nonprescription anabolic steroids in this report. Key findings for these outcomes include the following:

- In the 2018 HRBS, 0.4 percent (95-percent CI: 0.3–0.6) of reserve component service members reported use of any nonprescription cough or cold medicine in the past year (Table 5.19).
- There were no significant differences in nonprescription cough or cold medicine use between the services (Table 5.19), between pay grades (Table 5.20), or between genders (Table 5.21).
- There were no differences in rates of nonprescription cough or cold medicine use by race/ethnicity or by age group (Appendix Tables D.35 and D.36).

Past-12-Month Marijuana or Synthetic Cannabis Use

Key findings for marijuana and synthetic cannabis use include the following:

- In the 2018 HRBS, 2.5 percent (95-percent CI: 2.0–3.0) of reserve component service members reported use of marijuana or synthetic cannabis in the past 12 months (Table 5.19).
- The Army National Guard reported the highest rate of marijuana or synthetic cannabis use in the past 12 months (Table 5.19), with rates significantly higher than the Air Force Reserve, Air National Guard, Army Reserve, and the Navy Reserve.
- The highest percentage of marijuana or synthetic cannabis use was among junior enlisted personnel (E1–E4), who had significantly higher usage rates than all other pay grades except warrant officers (W1–W5; Table 5.20).
- Men and women reported similar rates of marijuana or synthetic cannabis use in the past 12 months (Table 5.21).
- There were no significantly differences between rates of marijuana and synthetic cannabis use by race/ethnicity (Appendix Table D.35). Younger service members reported

higher rates of marijuana and synthetic cannabis use compared with older service members (Appendix Table D.36).

Past-12-Month Use of Drugs Excluding Marijuana or Synthetic Cannabis Use

Key findings for drug use excluding marijuana and synthetic cannabis in the past 12 months include the following:

- In the 2018 HRBS, 0.7 percent (95-percent CI: 0.4–1.0) of reserve component service members reported use of other drugs besides marijuana and synthetic cannabis in the past 12 months (Table 5.19).
- The Army National Guard reported the highest rate of nonmarijuana drug use in the past 12 months (Table 5.19), with rates significantly higher than the Air Force Reserve, Air National Guard, and Army Reserve.
- The only significant difference for pay grade was with junior enlisted personnel (E1–E4) reporting higher rates than senior enlisted personnel (E7–E9; Table 5.20).
- There were no significant differences between men and women for 12-month nonmarijuana and non–synthetic cannabis use (Table 5.21).
- Reserve component service members of other races/ethnicities were significantly more likely to use drugs other than marijuana or synthetic cannabis compared with non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic Asian service members (Appendix Table D.35). For age, younger reserve component service members reported greater rates of drug use other than marijuana than older service members (Appendix Table D.36).

Past-30-Day Use of Any Drugs

Tables 5.22 through 5.24 detail past-30-day use of drugs among all reserve component personnel. Key findings for all drugs (i.e., any use of marijuana, synthetic cannabis, inhalants, synthetic stimulants, and "other illegal drugs") include the following:

- In the 2018 HRBS, 1.4 percent (95-percent CI: 1.1–1.8) of all reserve component service members reported use of drugs in the past 30 days (Table 5.22).
- The Army National Guard and Marine Corps Reserve reported significantly higher past-30-day drug use rates than the Air Force Reserve and the Air National Guard (Table 5.22).
- The highest percentage of drug use was among junior enlisted personnel (E1–E4), who reported significantly higher rates of use than senior enlisted personnel (E7–E9) and senior officers (O4–O6; Table 5.23).
- Men and women reported similar rates of past-30-day drug use (Table 5.24).
- There were no significant differences in any past-30-day drug use reported by reserve component service members of varying racial/ethnic groups (Appendix Table D.37). Younger personnel reported significantly more drug use than older personnel (Appendix Table D.38).

Past-30-Day Marijuana or Synthetic Cannabis Use

Key findings for marijuana and synthetic cannabis use include the following:

Table 5.22
Past-30-Day Drug Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any past-30-day drug use	0.1%[d,e] (0.0–0.2)	0.4%[d,e] (0.1–0.7)	1.0% (0.5–1.5)	2.3%[a,b] (1.5–3.0)	2.5%[a,b] (0.3–4.6)	1.0% (0.3–1.6)	0.5% (0.0–1.5)	1.0% (0.6–1.3)	1.8% (1.2–2.4)	1.4% (1.1–1.8)
Any past-30-day marijuana or synthetic cannabis use	0.1%[d,e] (0.0–0.2)	0.3%[d,e] (0.03–0.5)	1.0% (0.5–1.5)	2.1%[a,b] (1.3–2.9)	2.5%[a,b] (0.3–4.6)	0.7% (0.1–1.3)	0.5% (0.0–1.5)	0.9% (0.6–1.3)	1.6% (1.1–2.2)	1.3% (1.0–1.7)
Any past-30-day drug use, excluding marijuana and synthetic cannabis[x]	0.0% (0.0–0.2)	0.2% (0.0–0.3)	0.1% (0.0–0.1)	0.3% (0.1–0.4)	0.8% (0.0–1.8)	0.3% (0.0–0.8)	0.0% (0.0–1.6)	0.2% (0.0–0.3)	0.2% (0.1–0.4)	0.2% (0.1–0.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Table 5.23
Past-30 Day Drug Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any past-30-day drug use	2.3%[c,f] (1.5–3.1)	1.2%[c] (0.8–1.7)	0.3%[a,b] (0.1–0.4)	0.6% (0.0–1.8)	0.4% (0.0–0.9)	0.2%[a] (0.0–0.4)
Any past-30-day marijuana or synthetic cannabis use	2.2%[c,e,f] (1.4–3.0)	1.2%[c] (0.7–1.6)	0.2%[a,b] (0.1–0.3)	0.6% (0.0–1.8)	0.1%[a] (0.0–0.3)	0.1%[a] (0.0–0.3)
Any past-30-day drug use, excluding marijuana and synthetic cannabis[z]	0.2% (0.05–0.4)	0.2% (0.1–0.4)	0.1% (0.0–0.2)	0.6% (0.0–1.8)	0.3% (0.0–0.7)	0.2% (0.0–0.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.24
Past-30-Day Drug Use, by Gender

	Men	Women
Any past-30-day drug use[z]	1.5% (1.0–1.9)	1.3% (0.6–2.0)
Any past-30-day marijuana or synthetic cannabis use[z]	1.4% (0.9–1.8)	1.2% (0.5–1.9)
Any past-30-day drug use, excluding marijuana and synthetic cannabis[z]	0.2% (0.1–0.3)	0.2% (0.004–0.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- In the 2018 HRBS, 1.3 percent (95-percent CI: 1.0–1.7) of reserve component service members reported use of marijuana or synthetic cannabis in the past 30 days (Table 5.22).
- Army National Guard and Marine Corps Reserve personnel reported significantly higher past-30-day marijuana or synthetic cannabis use rates than the Air Force Reserve and the Air National Guard (Table 5.22).
- The highest percentage of marijuana and synthetic cannabis use was among junior enlisted personnel (E1–E4), who reported higher rates of use than senior enlisted personnel (E7–E9), junior officers (O1–O3), and senior officers (O4–O6; Table 5.23).
- Men and women reported similar rates of past-30-day marijuana and synthetic cannabis use (Table 5.24).

- There were no significant differences in use rates between reserve component service members from different racial/ethnic groups (Appendix Table D.37). Significantly more younger personnel than older personnel reported marijuana and synthetic cannabis use (Appendix Table D.38).

Past-30-Day Use of Drugs Excluding Marijuana or Synthetic Cannabis

Key findings for drug use excluding marijuana and synthetic cannabis in the past 30 days include the following:

- In the 2018 HRBS, 0.2 percent (95-percent CI: 0.1–0.3) of reserve component service members reported use of drugs other than marijuana and synthetic cannabis in the past 30 days (Table 5.22).
- There were no significant differences in the rate of use of drugs other than marijuana and synthetic cannabis across service branches (Table 5.22).
- There were no significant differences in the rate of use of drugs other than marijuana and synthetic cannabis across pay grades (Table 5.23).
- Men and women reported similar rates of use of drugs other than marijuana and synthetic cannabis in the past 30 days (Table 5.24).
- There was one significant difference in the rate of use of drugs other than marijuana and synthetic cannabis by racial/ethnic group (Appendix Table D.37): Service members who identified as Other race/ethnicity reported more past-30-day use of these drugs than non-Hispanic black service members. There were no statistically significant differences by age group (Appendix Table D.38).

Prescription Drug Use

The next set of tables display use of prescription drugs in the past year. Note that use in these tables includes *any* use and does not take prescription status into account (i.e., whether the service member had a valid prescription to use a specific drug). We focused on use of three specific categories of prescription drugs: stimulants, sedatives, and pain relievers.

A total of 12.1 percent (95-percent CI: 11.4–12.8) of respondents reported using any prescription drug in the past year (Table 5.25). The prescription drug type used most commonly was pain relievers (8.3 percent; 95-percent CI: 7.7–8.9), which were used almost twice as much as prescription sedatives (4.5 percent; 95-percent CI: 4.1–4.9) and four times as much as prescription stimulants (2.6 percent; 95-percent CI: 2.2–3.0; Table 5.25). Data from the 2018 NSDUH indicated that 6.5 percent of adults used prescription stimulants, 18.1 percent used prescription sedatives or tranquilizers, and 33.1 percent used prescription pain relievers in the past year (Substance Abuse and Mental Health Services Administration, 2019c). This suggests lower rates of prescription drug use across categories among reserve component service members; this difference is especially striking for prescription pain relievers.

Tables 5.25 through 5.27 present use of prescription drugs in the past year for different groups. There were few notable differences across service branch:

- Use of any prescription drugs, as well as prescription sedatives and pain relievers more specifically, was more common among senior enlisted reserve component service members than among junior enlisted personnel.

Table 5.25
Past-Year Prescription Drug Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any prescription drug use	9.8%[d] (8.4–11.3)	10.8% (9.6–12.1)	11.7% (10.4–13.0)	13.4%[a] (12.1–14.8)	12.2% (8.6–15.9)	10.7% (8.8–12.7)	8.4% (4.8–12.0)	11.2% (10.3–12.1)	12.8% (11.7–13.9)	12.1% (11.4–12.8)
Prescription stimulants	1.5%[d] (0.9–2.1)	2.0%[d] (1.4–2.5)	2.2% (1.6–2.7)	3.5%[a,b,f] (2.6–4.4)	2.4% (0.6–4.1)	1.4%[d] (0.8–2.0)	0.9% (0.0–2.2)	1.9% (1.5–2.3)	3.1% (2.4–3.8)	2.6% (2.2–3.0)
Prescription sedatives[z]	3.4% (2.6–4.3)	4.5% (3.7–5.4)	4.8% (4.0–5.7)	4.6% (3.9–5.2)	5.3% (2.9–7.6)	4.1% (3.1–5.2)	3.7% (1.0–6.4)	4.5% (3.9–5.0)	4.5% (4.0–5.1)	4.5% (4.1–4.9)
Prescription pain relievers[z]	7.1% (5.8–8.4)	7.1% (6.1–8.1)	8.3% (7.2–9.4)	9.0% (7.9–10.1)	8.8% (5.5–12.2)	7.6% (5.9–9.4)	6.5% (3.2–9.9)	8.0% (7.2–8.8)	8.5% (7.7–9.4)	8.3% (7.7–8.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.26
Past-Year Prescription Drug Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any prescription drug use	9.3%[b,c,d,f] (8.0–10.6)	13.0%[a,c,d] (11.8–14.1)	18.1%[a,b,e,f] (16.6–19.5)	19.9%[a,b,e] (15.0–24.7)	12.6%[c,d] (10.4–14.7)	13.4%[a,c] (11.9–14.8)
Prescription stimulants[z]	2.4% (1.6–3.3)	2.4% (1.8–2.9)	3.0% (2.4–3.7)	3.0% (1.0–5.1)	3.7% (2.2–5.3)	2.2% (1.5–2.9)
Prescription sedatives	2.4%[b,c,d,e,f] (1.8–3.0)	5.5%[a,c] (4.7–6.3)	8.0%[a,b,e,f] (7.0–9.0)	9.2%[a] (5.5–12.8)	5.1%[a,c] (3.8–6.3)	5.8%[a,c] (4.8–6.8)
Prescription pain relievers	6.6%[c,d,f] (5.5–7.6)	8.6%[c,d] (7.7–9.6)	12.8%[a,b,e,f] (11.6–14.0)	15.8%[a,b,e,f] (11.2–20.4)	7.5%[c,d] (5.8–9.2)	9.3%[a,c,d] (8.1–10.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.27
Past-Year Prescription Drug Use, by Gender

	Men	Women
Any prescription drug use	11.0%[a] (10.2–11.8)	16.4% (15.1–17.8)
Prescription stimulants	2.2%[a] (1.8–2.7)	3.9% (3.0–4.7)
Prescription sedatives	4.1%[a] (3.6–4.6)	6.2% (5.4–6.9)
Prescription pain relievers	7.6%[a] (7.0–8.3)	10.9% (9.8–11.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

- Women (16.4 percent; 95-percent CI: 15.1–17.8) were more likely than men (11.0 percent; 95-percent CI: 10.2–11.8) to use any prescription drugs. This was also the case for each of the categories of prescription medications.
- Non-Hispanic Asian service members were significantly less likely to use any prescription drugs than were other racial/ethnic groups (Appendix Table D.39).
- Service members ages 17–24 (6.9 percent; 95-percent CI: 5.5–8.4) had significantly lower rates of prescription drug use, followed by service members ages 25–34 (12.4 percent; 95-percent CI: 11.1–13.7). Service members ages 35–44 and 45 and up did not have significantly different rates of any prescription drug use from each other. However, service members age 45 and up had significantly higher rates of prescription pain reliever use (12.3 percent; 95-percent CI: 11.3–13.3) than other age groups (Appendix Table D.40).

Prescription Drug Misuse

Table 5.28 shows the percentages of service members misusing each of the three prescription drug categories assessed in the 2018 HRBS. In this survey, *misuse* was defined as use of a prescription drug in any way not directed by a doctor, which could include use without a prescription of one's own or using it in greater amounts, more often, or for longer than it was prescribed. Key findings include the following:

- Among reserve component service members, 1.7 percent (95-percent CI: 1.3–2.1) misused one or more of the prescription drug types in the past year.
- Though rates of misuse were low (in the absolute sense) across all categories of prescription drugs, prescription pain relievers were misused most often (1.0 percent; 95-percent CI: 0.7–1.3).

Reducing the nonmedical use of pain relievers, stimulants, and sedatives is an objective of HP2020, though specific goals have not yet been identified (Healthy People, 2020r; Office of Disease Prevention and Health Promotion, 2019). According to the 2018 NSDUH, 1.9 percent of adults reported misusing stimulants, 2.1 percent reporting misusing sedatives, and 3.7 percent reported misusing pain relievers in the past year (Substance Abuse and Mental Health Services Administration, 2019c). These data suggest that rates of misuse of stimulants and pain relievers were somewhat lower among reserve component service members than in the general population.

Tables 5.28 through 5.30 show overall rates of prescription drug misuse by service branch and other demographics. There were few differences with respect to service branch or pay grade (Table 5.29). Men (1.1 percent; 95-percent CI: 0.8–1.5) were more likely to misuse prescription pain relievers than women (0.6 percent; 95-percent CI: 0.4–0.9; Table 5.30). There were few significant differences by race/ethnicity or age (Appendix Tables D.41 and D.42).

Table 5.28
Past-Year Prescription Drug Misuse, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any prescription drug misuse	0.6%[d] (0.3–1.0)	0.7%[d] (0.4–1.1)	1.4% (0.9–1.9)	2.6%[a,b,f] (1.7–3.4)	2.3% (0.5–4.1)	0.8%[d] (0.3–1.3)	0.0% (0.0–1.6)	1.2% (0.9–1.6)	2.1% (1.5–2.8)	1.7% (1.3–2.1)
Prescription stimulant misuse	0.1%[d,e] (0.0–0.2)	0.1%[d,e] (0.0–0.2)	0.4% (0.1–0.6)	1.0%[a,b] (0.4–1.6)	1.2%[a,b] (0.0–2.6)	0.1% (0.0–0.4)	0.0% (0.0–1.6)	0.4% (0.2–0.6)	0.8% (0.3–1.3)	0.6% (0.3–0.9)
Prescription sedative misuse[z]	0.3% (0.1–0.6)	0.4% (0.2–0.7)	0.7% (0.3–1.0)	0.6% (0.3–1.0)	1.5% (0.0–3.1)	0.5% (0.1–0.9)	0.0% (0.0–1.6)	0.6% (0.4–0.9)	0.6% (0.3–0.9)	0.6% (0.4–0.8)
Prescription pain reliever misuse	0.3%[d] (0.03–0.6)	0.4%[d] (0.1–0.6)	0.7% (0.3–1.0)	1.6%[a,b] (1.0–2.2)	2.0% (0.2–3.8)	0.4% (0.02–0.7)	0.0% (0.0–1.6)	0.7% (0.4–0.9)	1.3% (0.8–1.7)	1.0% (0.7–1.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.29
Past-Year Prescription Drug Misuse, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any prescription drug misuse	2.1%[e,f] (1.3–3.0)	1.6% (1.1–2.1)	1.8%[e] (1.3–2.3)	2.0% (0.4–3.6)	0.6%[a,c] (0.2–1.0)	0.8%[a] (0.4–1.2)
Prescription stimulant misuse[x]	1.0% (0.3–1.6)	0.3% (0.1–0.5)	0.4% (0.1–0.7)	0.6% (0.0–1.8)	0.1% (0.0–0.3)	0.3% (0.04–0.5)
Prescription sedative misuse[z]	0.6% (0.2–1.0)	0.7% (0.4–0.9)	1.0% (0.6–1.4)	0.6% (0.0–1.3)	0.3% (0.04–0.5)	0.3% (0.1–0.6)
Prescription pain reliever misuse	1.3%[f] (0.7–1.8)	1.0% (0.6–1.4)	1.0% (0.6–1.3)	1.1% (0.1–2.1)	0.3% (0.01–0.6)	0.3%[a] (0.1–0.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 5.30
Past-Year Prescription Drug Misuse, by Gender

	Men	Women
Any prescription drug misuse[z]	1.8% (1.3–2.2)	1.6% (1.0–2.2)
Prescription stimulant misuse[z]	0.6% (0.3–0.9)	0.6% (0.1–1.0)
Prescription sedative misuse[z]	0.6% (0.4–0.8)	0.7% (0.4–1.0)
Prescription pain reliever misuse	1.1%[a] (0.8–1.5)	0.6% (0.4–0.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Comparisons with the 2018 HRBS Active Component Sample

Table 5.31 presents comparison of the key outcomes in this chapter between service members in the reserve and active components. Recall that RRs and ARRs greater than 1.0 indicate that the reserve component had higher prevalence rates than the active component, whereas RRs and ARRs below 1.0 indicate that the reserve component has lower prevalence rates than the active component. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Alcohol

In terms of comparisons between the active and reserve components on the 2018 HRBS on alcohol outcomes:

- Reserve component service members reported statistically significantly lower levels of past-30-day binge drinking in the unadjusted model (RR = 0.85, CI: 0.81, 0.90) than active component service members. In the adjusted model (ARR = 0.94, 0.89, 1.00), the significance level dropped. In the adjusted model, reserve component service members had a 6-percent lower rate of binge drinking in the past 30 days than active component service members.
- Reserve component service members reported statistically significantly lower levels of heavy drinking in the adjusted model (ARR = 0.85, CI: 0.74, 0.98) than active component service members. In the adjusted model, reserve component service members had a 15-percent lower rate of heavy drinking in the past 30 days.
- Reserve component service members reported statistically significantly lower levels of any alcohol consequences in the adjusted model (ARR = 0.81, CI: 0.68, 0.97) than active component service members, with the reserve component reporting a 19-percent lower rate than active component service members. Reserve component service members reported statistically significantly higher levels of risky drinking and driving behavior than active component service members in the unadjusted model (RR = 1.26, CI: 1.07, 1.47) but not in the adjusted (ARR = 1.17, CI: 0.97, 1.42) model. Reserve component service members did not report statistically significantly different levels of any productivity loss from drinking compared with active component service members.
- Compared with active component service members, reserve component service members reported statistically significantly lower levels of agreement that military culture was supportive of heavy drinking in the adjusted model (ARR = 0.79, CI: 0.73, 0.85). Reserve component service members had a 21-percent lower rate of agreement than active component service members.

Tobacco

Regarding tobacco use:

- Reserve component service members were significantly less likely to report any current tobacco or nicotine use (ARR = 0.84; 95-percent CI: 0.80, 0.89) or any current tobacco

Table 5.31
Rates of Substance Use in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Alcohol use		
Binge drinking	0.85*** (0.81, 0.90)	0.94* (0.89, 1.00)
Heavy drinking	0.76*** (0.67, 0.85)	0.85** (0.74, 0.98)
Any alcohol consequences	0.76*** (0.65, 0.89)	0.81** (0.68, 0.97)
Risky drinking and driving behavior	1.26*** (1.07, 1.47)	1.17 (0.97, 1.42)
Any productivity loss from drinking	0.94 (0.81, 1.09)	1.02 (0.86, 1.23)
Military culture supportive of drinking	0.72*** (0.67, 0.76)	0.79*** (0.73, 0.85)
Tobacco		
Current cigarette smoking	0.73*** (0.67, 0.79)	0.73*** (0.66, 0.80)
Current e-cigarette use	0.61*** (0.55, 0.68)	0.74*** (0.66, 0.84)
Current cigar smoking	0.81*** (0.72, 0.91)	0.94 (0.82, 1.07)
Current smokeless tobacco use	0.82*** (0.74, 0.91)	0.84*** (0.75, 0.95)
Current pipe or hookah smoker	0.59*** (0.49, 0.72)	0.74*** (0.60, 0.91)
Any current tobacco or nicotine use	0.81*** (0.77, 0.85)	0.84*** (0.80, 0.89)
Any current tobacco or nicotine smoking	0.76*** (0.71, 0.80)	0.81*** (0.76, 0.87)
Attempted to quit smoking	0.98 (0.88, 1.09)	0.97 (0.85, 1.09)
Reasons for e-cigarette use		
Perceived to be healthier than smoking cigarettes	0.92 (0.79, 1.08)	0.94 (0.79, 1.12)
Used to help quit smoking cigarettes	1.08 (0.93, 1.24)	1.01 (0.85, 1.18)
Able to use in places where cigarette smoking is not allowed	0.86* (0.72, 1.02)	0.89 (0.72, 1.09)
Marijuana and drug use		
Any past-12-month drug use	2.09*** (1.47, 2.97)	2.10*** (1.45, 3.03)

Table 5.31—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Any past-12-month marijuana or synthetic cannabis use	2.63*** (1.73, 3.99)	2.60*** (1.70, 3.98)
Any past-12-month drug use, excluding marijuana and synthetic cannabis	0.80 (0.45, 1.42)	0.86 (0.46, 1.60)
Any past-30-day drug use	2.90*** (1.70, 4.95)	3.12*** (1.98, 4.91)
Any past-30-day marijuana or synthetic cannabis use	3.77*** (1.96, 7.25)	4.13*** (2.42, 7.05)
Any past-30-day drug use, excluding marijuana and synthetic cannabis	0.82 (0.38, 1.77)	1.07 (0.49, 2.32)
Prescription drug use and misuse		
Any prescription drug use	0.72*** (0.67, 0.78)	0.61*** (0.56, 0.67)
Prescription stimulants	0.96 (0.77, 1.20)	0.77** (0.60, 0.98)
Prescription sedatives	0.68*** (0.60, 0.77)	0.55*** (0.48, 0.63)
Prescription pain relievers	0.69*** (0.63, 0.76)	0.57*** (0.51, 0.64)
Any prescription drug misuse	1.25 (0.90, 1.75)	1.00 (0.68, 1.48)
Prescription stimulant misuse	1.24 (0.59, 2.59)	1.05 (0.46, 2.37)
Prescription sedative misuse	1.56 (0.91, 2.67)	1.46 (0.74, 2.89)
Prescription pain reliever misuse	1.10 (0.74, 1.64)	0.88 (0.52, 1.49)

NOTES: RRs and ARRs above 1.0 indicate that the reserve component had an increased prevalence of the outcome in question compared with the active component; RRs and ARRs below 1.0 indicate that the reserve component had a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade. Low prevalence (i.e., any past-12-month drug use, any past-12-month drug use excluding marijuana and synthetic cannabis, any past-30-month drug use, any past-30-day marijuana or synthetic cannabis use, any past-12-month drug use excluding marijuana and synthetic cannabis) outcomes collapsed warrant officers and officers into a single group, collapsed DoD occupation code into combat versus noncombat codes, and dropped the interaction between service branch and pay grade and the missing flags for both education level and minority status.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

or nicotine smoking (ARR = 0.81; 95-percent CI: 0.76, 0.87). They reported significantly lower rates of use of each of the categories of tobacco than active component service members except cigar smoking.
- There were no significant differences between the active and reserve components with respect to attempts to quit smoking.
- There were also no significant differences between the active and reserve components with respect to reasons for e-cigarette use.

Marijuana Use and Drug Use

In terms of comparisons between the active and reserve components on the 2018 HRBS on past-12-month drug use:

- Reserve component service members reported statistically significantly higher levels of past-12-month drug use in the adjusted model (ARR = 2.10, CI: 1.45, 3.03) than active component service members.
- Reserve component service members reported statistically significantly higher levels of past-12-month marijuana or synthetic cannabis use in the adjusted model (ARR = 2.60, CI: 1.70, 3.98) than active component service members.
- Reserve component service members did not report statistically significantly different levels of any past-12-month use of drugs other than marijuana or synthetic cannabis compared with active component service members.
- Comparisons between active and reserve component service members on nonprescription cold or cough medicine and on anabolic steroid use in the past 12 months days were not included because of low prevalence rates.

In terms of comparisons between the active and reserve components on past-30-day drug use on the 2018 HRBS:

- Reserve component service members reported statistically significantly higher levels of past-30-day drug use in the adjusted model (ARR = 3.12, CI: 1.98, 4.91) than active component service members.
- Reserve component service members reported statistically significantly higher levels of past-30-day marijuana or synthetic cannabis use in the adjusted model (ARR = 4.13, CI: 2.42, 7.05) than active component service members.
- Reserve component service members did not report statistically significantly different levels of any past-30-day use of drugs other than marijuana or synthetic cannabis compared with active component service members.
- Comparisons between active and reserve component service members on nonprescription cold or cough medicine and on anabolic steroid use in the past 30 days were not included because of low prevalence rates.

Prescription Drug Use

Regarding the use of prescription drugs:

- Reserve component service members were significantly less likely to report any prescription drug use than active component service members (ARR = 0.61; 95-percent CI: 0.56,

0.67). They were also less likely to report use of each category of prescription drugs (i.e., stimulants, sedatives, and pain relievers).
- There were no significant differences between active component and reserve component service members with respect to the misuse of prescription drugs.

Summary

An estimated 29.0 percent of reserve component service members reported binge drinking, which was defined as consuming at least five drinks on the same occasion at least once in the past 30 days for men or at least four drinks on the same occasion at least once in the past 30 days for women. An estimated 7.4 percent of reserve component service members were current heavy drinkers, which was defined as binge drinking on at least one or two days a week in the past 30 days. These rates were lower than the rates among active component service members in the 2018 HRBS but higher than estimates in the general population of adults, although heavy drinking was defined slightly differently in the general population survey. An estimated 4.8 percent of service members experienced one or more serious consequences from drinking, with 6.1 percent reporting any risky drinking and driving behavior (i.e., as the driver or as the passenger), and 5.3 percent reported work-related productivity loss from alcohol use, such as working at a lower performance level due to drinking or reporting to work drunk after being off duty. Rates of consequences were generally lower in the reserve component than in the active component, with the exception of drinking and driving behavior and productivity loss due to drinking, which were not significantly different from the active component in an adjusted analytic model. Such findings have implications for military readiness and for targeted prevention and intervention efforts to help reduce drinking behavior and associated consequences among both reserve and active component service members. Notably, 20.2 percent of all reserve component service members agreed with at least one of the statements that military culture was supportive of drinking. Prevention and intervention efforts would likely need to address military culture at a systemic level to see any change in behavior, especially among these groups at higher risk.

An estimated 30.5 percent of service members currently use tobacco in some form. This rate is much higher than estimated rates of current tobacco use in the general population, though reserve component service members reported significantly less tobacco use across categories than active component service members. Cigarette smoking was the most commonly endorsed form of tobacco use (13.3 percent), followed by smokeless tobacco (11.0 percent) and e-cigarette use (9.9 percent). Given that the downstream health consequences of tobacco use are substantial, reducing tobacco use in service members remains an important goal. Regarding use of e-cigarettes, our findings suggest that the reasons for e-cigarette use among service members are similar to those in the general population and include perceptions of e-cigarettes as healthier and using cigarettes to help quit smoking. Given mounting evidence of adverse health consequences, understanding the factors that contribute to e-cigarette use in service members is important. As research accumulates related to e-cigarette cessation among civilians, there may be opportunities to implement similar interventions for service members.

Drug use rates among military personnel were estimated to be low, with 2.7 percent of service members reporting use of any drugs in the past 12 months and 1.4 percent reporting use of any drugs in the past 30 days. Very few reserve component service members reported

use of nonprescription cough or cough medicine or nonprescription anabolic steroids in the past 12 months and past 30 days. Rates of past-12-month marijuana or synthetic cannabis use were 2.5 percent, and rates of past-30-day marijuana or synthetic cannabis use were just about 1 percent (1.3 percent). Although many states have legalized recreational marijuana for sale, possession, and growth, which essentially has removed the criminal penalties for use in those states, the drug is still illegal for such recreational purposes in the military, and reserve component service members may still face serious consequences if they are using marijuana. Therefore, efforts to address prevention of marijuana use are needed across the services to help reserve component service members avoid serious consequences. Although rates of drug use were not directly comparable with the general population of adults, comparisons of any drug use or any marijuana or synthetic cannabis use in both the past 12 months and past 30 days between the reserve and active components from the 2018 HRBS generally indicated that reserve component service members reported significantly higher rates of drug use than active component service members.

Regarding prescription drugs, results suggest overall lower rates of past-year use of stimulants, sedatives, and pain relievers among service members compared with civilians, as well as lower rates of misuse. Rates of misuse were low (in the absolute sense) across all categories of prescription drugs. There were few significant differences with respect to service branch or pay grade; however, though women reported higher rates of prescription drug use across categories (stimulants, sedatives, and pain relievers), they also reported significantly lower rates of pain reliever misuse.

CHAPTER SIX

Mental and Emotional Health

This chapter presents the results regarding the social, emotional, and mental health of reserve component service members (Air Force Reserve, Air National Guard, Army Reserve, Army National Guard, Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve), including mental health indicators (e.g., serious psychological distress and PTSD), social and emotional factors associated with mental health (e.g., anger or aggression, unwanted sexual contact, and physical assault), suicide ideation and suicide attempts, and problematic gambling behaviors. Additionally, the chapter presents results on use of mental health services, unmet need for mental health treatment, and reasons that service members do not receive care when they believe they need it or have high levels of distress that might benefit from treatment.

Each section highlights the importance or relevance of the mental health topic to the general population and to the military and then provides an analysis of each topic by service branch. When relevant, we present analyses by pay grade and gender. Analyses by race/ethnicity and age group can be found in Appendix D. Key measures used are described in the applicable section, and additional details about these measures may be found in Appendix C. All analyses demonstrated statistically significant omnibus tests (a Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless otherwise noted in the tables. Statistically significant group differences (pairwise comparisons) are presented within each table. However, only those statistically significant differences that the research team's subject-matter experts determined to be substantively meaningful (i.e., those that could be used to change or develop policy or that contribute to inequalities in health outcomes across subgroups) are discussed in the text. When interpreting the findings of this chapter, note that social, emotional, and mental health findings are based on self-reported symptoms and behaviors. These are assessed using previously validated screening instruments, but they do not represent clinical diagnoses.

Where appropriate, the text compares reserve component service members with civilian benchmarks (i.e., HP2020 goals) and/or current prevalence rates among U.S. adults; however, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest. Readers should also use caution when interpreting comparisons between the 2018 HRBS results and other populations or prior versions of the HRBS because these comparisons are not necessarily statistically significant and could simply reflect sampling variability across the two samples being compared.

At the end of the chapter, we present comparisons between the active and reserve components on the key outcomes presented in this chapter. These comparative results use ARRs based

on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARR can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20-percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matters for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind what the base is for that increase or decrease. That is, an ARR of 1.2 (or a 20 percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Mental Health Status

Serious Psychological Distress

Overall mental health status was assessed using the K6 (Kessler, Barker, et al., 2003), a commonly used measure of nonspecific serious psychological distress. The K6 is designed to distinguish between distress that indicates the presence of a psychiatric disorder that a clinician would recognize and treat and distress that is commonly experienced but not suggestive of a clinical condition. It is nonspecific in the sense that it does not provide a diagnosis but indicates the likely presence of a clinical condition and problems severe enough to cause possible impairments in social, occupational, and other domains of functioning (Kessler, Barker, et al., 2003; Kessler, Berglund, et al., 2004). The NSDUH estimates that approximately 10.8 percent of U.S. adults ages 18 and older experienced past-year serious psychological distress (Center for Behavioral Health Statistics and Quality, 2013). Data from the NSDUH and other studies of the general population (e.g., NHIS; BRFSS; Medical Expenditure Panel Survey) suggest that between 2.9 percent and 5.2 percent of U.S. adults experienced serious psychological distress in the past month (Center for Behavioral Health Statistics and Quality, 2018). In the 2018 HRBS, mental health status was assessed for the past 30 days and for the worst month of the past year. Scores of 13 or higher on the K6 indicate serious psychological distress and discriminate highly between individuals with and without a clinical diagnosis of serious mental illness in the general population (Kessler, Barker, et al., 2003). Respondents with sum scores greater than or equal to 13 were categorized as having serious psychological distress.

Key findings from the 2018 HRBS reserve component include the following:

- Across all service branches, 10.7 percent (95-percent CI: 9.9–11.5) of service members reported serious psychological distress in the past year, and 6.5 percent (95-percent CI: 5.8–7.1) reported serious psychological distress in the past 30 days (Table 6.1). These rates of serious psychological distress are higher than those observed in the general population (i.e., 2.9 percent to 5.2 percent in the past month; Center for Behavioral Health Statistics and Quality, 2018).

Table 6.1
Serious Psychological Distress, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Past-month serious psychological distress	2.8%[c,d,e,f] (1.9–3.7)	2.9%[c,d,e,f] (2.1–3.7)	6.8%[a,b,g] (5.6–8.0)	8.0%[a,b,g] (6.6–9.3)	9.1%[a,b,g] (5.7–12.4)	6.5%[a,b,g] (4.8–8.1)	1.5%[c,d,e,f] (0.3–2.6)	6.1% (5.3–6.9)	6.7% (5.7–7.8)	6.5% (5.8–7.1)
Past-year serious psychological distress	4.9%[c,d,e,f] (3.8–6.0)	5.4%[c,d,e,f] (4.3–6.4)	11.4%[a,b,g] (9.9–12.9)	13.1%[a,b,g] (11.5–14.6)	12.2%[a,b,g] (8.4–16.1)	11.4%[a,b,g] (9.2–13.6)	4.7%[c,d,e,f] (2.2–7.3)	10.1% (9.1–11.1)	11.2% (10.0–12.4)	10.7% (9.9–11.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

- The 2018 HRBS prevalences of past-year and past-month serious psychological distress were statistically significantly different across service branches (Table 6.1). Patterns were similar for both past-year and past-month distress, such that rates were higher in the Army Reserve, Army National Guard, Marine Corps Reserve, and Navy Reserve compared with the Air Force Reserve, Air National Guard, and Coast Guard Reserve.
- Enlisted service members tended to show higher rates of past-year and past-month serious psychological distress compared with junior and senior officers, with junior enlisted service members (E1–E4) demonstrating the highest rates of both past-year (13.3 percent; 95-percent CI: 11.7–15.0) and past-month (8.3 percent; 95-percent CI: 6.9–9.7) serious psychological distress (Table 6.2).
- Women had a significantly higher prevalence of past-year serious psychological distress (14.1 percent; 95-percent CI: 12.7–15.6) than men (9.9 percent; 95-percent CI: 8.9–10.8; Table 6.3), but women and men did not differ with respect to rates of past-month serious psychological distress. This aligns with patterns observed among the general population, such that higher prevalence of psychological distress is typically observed among women compared with men (Weissman et al., 2015).

Table 6.2
Serious Psychological Distress, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Past-month serious psychological distress	8.3%[c,e,f] (6.9–9.7)	6.4%[e,f] (5.4–7.3)	4.8%[a,f] (4.0–5.7)	5.2% (2.2–8.1)	2.8%[a,b] (1.7–3.9)	2.7%[a,b,c] (2.1–3.4)
Past-year serious psychological distress	13.3%[b,c,e,f] (11.7–15.0)	10.4%[a,f] (9.3–11.6)	8.2%[a,f] (7.1–9.2)	7.3% (4.0–10.6)	7.3%[a] (5.6–9.0)	5.3%[a,b,c] (4.4–6.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.3
Serious Psychological Distress, by Gender

	Men	Women
Past-month serious psychological distress[z]	6.3% (5.5–7.1)	7.1% (6.0–8.2)
Past-year serious psychological distress	9.9%[a] (8.9–10.8)	14.1% (12.7–15.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Posttraumatic Stress Disorder

A majority of individuals in the United States and globally experience one or more psychological traumas in their lifetime (Atwoli et al., 2015; Benjet et al., 2016). Although most individuals who experience traumatic events do not develop PTSD (Atwoli et al., 2015), individuals who do develop PTSD may experience significant functional impairments (Kessler, 2000). PTSD is also associated with greater health care utilization, medical morbidity, and risky health behaviors, such as tobacco and heavy alcohol use (Hoge, Terhakopian, et al., 2007; Schnurr, 2015). Studies of the general population suggest that approximately 7 percent (CI: 6.2–7.8) of U.S. adults met criteria for PTSD at some point in their lives, and 3.5 percent (CI: 2.9–4.1) met criteria in the past year (Kessler, Berglund, et al., 2004). Psychological trauma is a well-known hazard associated with military service, and particularly combat experiences. Estimates of PTSD prevalence in military samples vary widely in relation to the sample's exposure to combat (Ramchand, Rudavsky, et al., 2015; Ramchand, Schell, et al., 2010; Sundin et al., 2010). A recent systematic review and meta-analysis examining mental health indicators among reserve component service members suggests that rates of PTSD are similar among reserve and active component service members (respectively, 9.8 percent, CI: 5.9–13.7; and 8.9 percent, CI: 5.7–12.1), although prevalence estimates varied considerably across branches and in relation to combat exposure (Cohen, Fink, et al., 2015). PTSD can lead to considerable suffering and impairment for individuals afflicted by this condition and contributes to military attrition, absenteeism, misconduct, and sick call visits (Hoge, Terhakopian, et al., 2007; Hoge, Grossman, et al., 2014). In addition, some data suggest that, following combat deployment, reserve component service members may face unique readjustment challenges that may increase risks of psychiatric problems, such as PTSD and associated functional impairments, compared with active component service members (Thomas et al., 2010).

The 2018 HRBS measured PTSD using the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5; Prins, Bovin, et al., 2016), a brief screening measure for PTSD. Respondents were first asked whether they had experienced a traumatic event in their lifetime. If yes, they were asked whether in the past 30 days they had experienced five symptoms that correspond to cardinal symptoms of PTSD (nightmares, re-experiencing, and/or intrusive thoughts about the event; avoidance; hypervigilance; emotion numbness; persistent feelings of guilt or blame surrounding the event). Past research has shown that the Primary Care PTSD Screen (on which the PC-PTSD-5 is based) performs similarly to longer PTSD screening measures (e.g., the 17-item PTSD Checklist–Civilian [PCL-C]; Bliese et al., 2008). A preliminary validation study conducted with a sample of 398 veterans also showed that the PC-PTSD-5 had excellent predictive utility with respect to clinical diagnosis of PTSD (Prins, Bovin, et al., 2016). We chose a cut point of three or higher to indicate probable PTSD, which has been shown to be optimally sensitive to probable PTSD in prior studies (Prins, Bovin, et al., 2016).

Key findings from the 2018 HRBS reserve component for PTSD include the following:

- Across all service branches, 10.5 percent (95-percent CI: 9.8–11.1) of service members reported probable PTSD, which is higher than rates of past-year PTSD observed in studies of the general population (Kessler, Berglund, et al., 2004).
- The 2018 HRBS distribution of probable PTSD was statistically significantly different across service branches (Table 6.4). Similar to rates of serious psychological distress, rates of probable PTSD were significantly higher in the Army Reserve (12.3 percent;

Table 6.4
Probable PTSD, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Probable PTSD (PC-PTSD-5 score ≥3)	5.5%[c,d,f] (4.4–6.5)	6.9%[c,d] (5.8–8.0)	12.3%[a,b,g] (11.0–13.7)	12.0%[a,b,g] (10.7–13.2)	9.4% (6.4–12.5)	8.9%[a] (7.1–10.6)	6.0%[c,d] (3.3–8.6)	10.1% (9.2–10.9)	10.8% (9.8–11.8)	10.5% (9.8–11.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

95-percent CI: 11.0–13.7) and Army National Guard (12.0 percent; 95-percent CI: 10.7–13.2) than in the Air Force Reserve (5.5 percent; 95-percent CI: 4.4–6.5), Air National Guard (6.9 percent; 95-percent CI: 5.8–8.0), and Coast Guard Reserve (6.0 percent; 95-percent CI: 3.3–8.6).

- Rates of probable PTSD also varied by pay grade, such that mid-level (E5–E6) and senior (E7–E9) enlisted service members and warrant officers tended to show higher rates of probable PTSD compared with junior enlisted service members and junior and senior officers (Table 6.5).
- Women had a significantly higher prevalence of probable PTSD (13.3 percent; 95-percent CI: 12.0–14.6) than men (9.7 percent; 95-percent CI: 8.9–10.5; Table 6.6), which is consistent with findings from the general population (Kessler, Berglund, et al., 2004).
- There were also differences in rates of probable PTSD by service member age, such that younger service members showed lower rates of probable PTSD compared with older service members (Appendix Table D.46). This may be attributable to higher rates of lifetime combat deployment, a well-established risk factor for PTSD (Ramchand, Rudavsky, et al., 2015; Ramchand, Schell, et al., 2010; Sundin et al., 2010), among older service members compared with their younger counterparts.

Table 6.5
Probable PTSD, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Probable PTSD (PC-PTSD-5 score ≥3)	7.9%[b,c,d] (6.7–9.1)	12.8%[a,c,e,f] (11.6–14.0)	16.3%[a,b,e,f] (14.9–17.8)	12.6%[a] (9.2–15.9)	7.7%[b,c] (6.0–9.4)	9.0%[b,c] (7.8–10.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.6
Probable PTSD, by Gender

	Men	Women
Probable PTSD (PC-PTSD-5 score ≥3)	9.7%[a] (8.9–10.5)	13.3% (12.0–14.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Social and Emotional Factors Associated with Mental Health

We turn now to social and emotional factors that are associated with mental health, including angry or aggressive behavior, unwanted sexual contact, and physical assault. Detailed descriptions of each measure can be found in Appendix C. Results are shown in Tables 6.7 through 6.15.

Anger and Aggression

Anger and aggression are frequently reported among combat veterans (Jakupcak et al., 2007; Killgore et al., 2008). Angry or aggressive behavior can result in military personnel physically harming themselves or others, can lead to domestic violence and other illegal acts, and could affect military readiness (Killgore et al., 2008; Thomas et al., 2010). Identifying levels of angry or aggressive behavior among military service members could identify needs for policy or programmatic responses. To assess levels of aggressive behavior in the 2018 HRBS, respondents were asked to report how often in the past 30 days they had engaged in the following behaviors: got angry at someone and yelled or shouted; got angry with someone and kicked, slammed, or punched something; made a violent threat; or fought or hit someone (Thomas et al., 2010).

Key findings in the 2018 HRBS among the reserve component include the following:

- Across all service branches, nearly half (46.9 percent; 95-percent CI: 45.7–48.1) of service members reported at least one of the four angry or aggressive behaviors in the past 30 days, and 6.2 percent (95-percent CI: 5.6–6.8) reported a recent recurrent pattern of these behaviors (one or more of the four behaviors occurring five or more times in the past 30 days; Table 6.7).
- Angry or aggressive behaviors varied significantly across service branches, such that rates of any aggressive behaviors were highest among the Army National Guard (52.6 percent; 95-percent CI: 50.5–54.7), Marine Corps Reserve (49.7 percent; 95-percent CI: 43.6–55.8), and Navy Reserve (50.1 percent; 95-percent CI: 46.3–53.8) and lower among the Air Force Reserve (34.8 percent; 95-percent CI: 32.2–37.3) and Air National Guard (35.3 percent; 95-percent CI: 33.3–37.3). The percentage of service members reporting recurrent angry or aggressive behavior was highest in the Marine Corps Reserve (9.5 percent; 95-percent CI: 6.1–13.0), followed by the Army National Guard (7.3 percent; 95-percent CI: 6.2–8.5), and lowest among the Air Force Reserve (3.1 percent; 95-percent CI: 2.3–4.0) and Air National Guard (3.7 percent; 95-percent CI: 2.9–4.5; Table 6.7).
- Rates of angry or aggressive behaviors varied across pay grades. Patterns differed slightly for any aggressive behaviors and recurrent angry or aggressive behaviors, but more-senior enlisted service members (E7–E9) tended to demonstrate the highest rates of both any past-month angry or aggressive behaviors (50.2 percent; 95-percent CI: 48.3–52.1) and recurrent angry or aggressive behaviors (6.6 percent; 95-percent CI: 5.7–7.5), whereas officers tended to show lower rates of these behaviors (Table 6.8).
- Men demonstrated lower rates of any angry or aggressive behaviors (45.9 percent; 95-percent CI: 44.4–47.3) compared with women (50.9 percent; 95-percent CI: 49.0–52.8), but men and women did not differ with respect to rates of recurrent angry or aggressive behaviors (Table 6.9).

Table 6.7
Angry and Aggressive Behaviors, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any angry or aggressive behavior in past 30 days	34.8%[c,d,e,f] (32.2–37.3)	35.3%[c,d,e,f] (33.3–37.3)	46.1%[a,b,d] (43.8–48.5)	52.6%[a,b,c,g] (50.5–54.7)	49.7%[a,b] (43.6–55.8)	50.1%[a,b] (46.3–53.8)	40.1%[d] (33.4–46.7)	44.9% (43.3–46.5)	48.5% (46.8–50.2)	46.9% (45.7–48.1)
Angry or aggressive behavior 5+ times in past 30 days	3.1%[c,d,e,f] (2.3–4.0)	3.7%[c,d,e] (2.9–4.5)	5.9%[a,b] (4.9–6.9)	7.3%[a,b] (6.2–8.5)	9.5%[a,b] (6.1–13.0)	5.8%[a] (4.2–7.5)	6.3% (3.1–9.5)	5.8% (5.0–6.5)	6.5% (5.6–7.4)	6.2% (5.6–6.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 6.8
Angry and Aggressive Behaviors, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any angry or aggressive behavior in past 30 days	46.8% (44.5–49.1)	47.1% (45.3–49.0)	50.2%[e,f] (48.3–52.1)	47.5% (41.7–53.4)	43.6%[c] (40.3–46.8)	44.7%[c] (42.6–46.7)
Angry or aggressive behavior 5+ times in past 30 days	6.7%[e] (5.5–7.9)	6.0% (5.1–6.9)	6.6%[e] (5.7–7.5)	6.1% (3.1–9.1)	3.5%[a,c] (2.1–4.9)	5.7% (4.6–6.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.9
Angry and Aggressive Behaviors, by Gender

	Men	Women
Any angry or aggressive behavior in past 30 days	45.9%[a] (44.4–47.3)	50.9% (49.0–52.8)
Angry or aggressive behavior 5+ times in past 30 days[z]	6.1% (5.4–6.8)	6.5% (5.4–7.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Unwanted Sexual Contact

The experience of a sexual assault has potentially severe consequences for the victim, as well as costs for institutions and society more broadly (Smith et al., 2018; Lang et al., 2003; Peterson, DeGue, et al., 2017). In the general population in the United States, over 40 percent of women and approximately one in five men have experienced contact sexual violence (i.e., rape, being made to penetrate someone else, sexual coercion, or unwanted sexual contact) in their lifetime (Smith et al., 2018). The HP2020 initiative lists reducing sexual violence—including rape and attempted rape as well as abusive sexual contact other than rape or attempted rape—as a developmental objective. Negative consequences for victims can include immediate physical harm (from the assault itself), increased risks of sexually transmitted infections (STIs), pregnancy, mental health problems (such as PTSD), and chronic health problems (Stein et al., 2004; Suris and Lind, 2008; Jina and Thomas, 2013; Frayne et al., 1999; Resnick et al., 2007; Suris et al., 2007). Past research among civilian samples has shown that, following a sexual assault, outpatient medical visits increased by over 50 percent, and increased utilization persisted for at least

three years (Koss, 1993). Available data also suggest that military service members who experience sexual assault suffer from a range of significant problems (see Turchik and Wilson, 2010; Weaver and Clum, 1995; Stander and Thomsen, 2016).

In addition to its potential consequences on individuals' functioning, unwanted sexual contact experienced by military service members is important to assess because it represents a breakdown in order and discipline and could negatively affect retention, recruitment, and readiness. Similar to the 2015 HRBS, the 2018 HRBS assessed respondents' experiences of unwanted sexual contact, which is a broad category that includes sexual assault as well as other unwanted touching of a sexual nature. Items were modified from those used in the 2015 HRBS to focus exclusively on experiences that have occurred since joining the military and during the past 12 months (lifetime experience of unwanted sexual contact is no longer asked) and to more clearly define unwanted sexual contact. Specifically, the 2018 HRBS survey item asks respondents about "times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration." It is important to remember that direct comparisons with other civilian and military surveys, such as the WGRA and the Workplace and Gender Relations Survey of Reserve Component Members (WGRR), are not appropriate given differences in question wording.

Key findings in the 2018 HRBS reserve component include the following:

- Among all reserve component service members, 7.8 percent (95-percent CI: 7.3–8.3) indicated having any unwanted sexual contact since joining the military, and 1.6 percent (95-percent CI: 1.2–1.9) indicated having any unwanted sexual contact in the past 12 months (Table 6.10).
- There were some statistically significant differences in responses about experiences of unwanted sexual contact across service branches, such that rates of any unwanted sexual contact since joining the military were significantly higher in the Navy Reserve (12.0 percent; 95-percent CI: 10.0–13.9) compared with all other branches except the Coast Guard Reserve (8.7 percent; 95-percent CI: 5.6–11.7). With respect to unwanted sexual contact in the past 12 months, rates were significantly higher among the Army National Guard (2.3 percent; 95-percent CI: 1.6–3.0) than among the Air Force Reserve (0.6 percent; 95-percent CI: 0.3–0.9) and Air National Guard (0.8 percent; 95-percent CI: 0.5–1.1; Table 6.10).
- Rates of unwanted sexual contact also differed by pay grade, such that rates of unwanted sexual contact since joining the military were lowest among junior enlisted (E1–E4) service members (6.2 percent; 95-percent CI: 5.2–7.2) compared with other pay grades. In contrast, rates of unwanted sexual contact in the past 12 months were highest among junior enlisted service members (2.5 percent; 95-percent CI: 1.8–3.2) compared with other pay grades (Table 6.11).
- Women indicated experiencing substantially higher rates of unwanted sexual contact than men. Specifically, rates of unwanted sexual contact since joining the military were more than six times higher among women (24.0 percent; 95-percent CI: 22.5–25.6) compared with men (3.6 percent; 95-percent CI: 3.1–4.2). A similar pattern was observed for unwanted sexual contact in the past 12 months, with rates of 4.6 percent (95-percent CI: 3.5–5.6) among women and 0.8 percent (95-percent CI: 0.5–1.1) among men (Table 6.12).

Table 6.10
Unwanted Sexual Contact, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Unwanted sexual contact since joining the military	7.0%[f] (5.9–8.1)	6.2%[c,f] (5.4–7.0)	8.5%[b,f] (7.4–9.6)	7.7%[f] (6.7–8.7)	4.7%[f] (2.7–6.7)	12.0%[a,b,c,d,e] (10.0–13.9)	8.7% (5.6–11.7)	8.4% (7.6–9.1)	7.3% (6.6–8.1)	7.8% (7.3–8.3)
Unwanted sexual contact in the past 12 months	0.6%[d] (0.3–0.9)	0.8%[d] (0.5–1.1)	1.4% (1.0–1.9)	2.3%[a,b] (1.6–3.0)	0.9% (0.0–1.9)	0.8% (0.3–1.3)	0.2% (0.0–0.7)	1.1% (0.8–1.4)	2.0% (1.4–2.5)	1.6% (1.2–1.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. The exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 6.11
Unwanted Sexual Contact, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Unwanted sexual contact since joining the military	6.2%[b,c,e,f] (5.2–7.2)	9.0%[a] (8.1–10.0)	9.0%[a] (8.1–10.0)	9.0% (5.6–12.4)	9.0%[a] (7.3–10.7)	8.9%[a] (7.8–9.9)
Unwanted sexual contact in the past 12 months	2.5%[b,c,f] (1.8–3.2)	1.1%[a,c] (0.7–1.4)	0.4%[a,b,e] (0.1–0.6)	0.8% (0.0–1.7)	1.4%[c] (0.5–2.3)	0.5%[a] (0.2–0.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. The exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.12
Unwanted Sexual Contact, by Gender

	Men	Women
Unwanted sexual contact since joining the military	3.6%[a] (3.1–4.2)	24.0% (22.5–25.6)
Unwanted sexual contact in the past 12 months	0.8%[a] (0.5–1.1)	4.6% (3.5–5.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. The exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[a] Statistically significantly different from women's estimate.

Physical Assault

Physical assault is associated with a range of negative consequences, including PTSD and other psychological problems (Scarpa, 2003; Rademaker et al., 2008). Experiencing physical assault is common among the general population, with nearly 2.9 million individuals aged 12 and older in the United Staets reporting one or more violent victimizations in the past year as of 2016 (Morgan and Kena, 2018). Reducing physical assaults from 21.3 per 1,000 people (baseline data in 2008) to 19.2 per 1,000 people is an HP2020 objective (Healthy People, 2020f). Items in the 2018 HRBS were refined from those used in the 2015 HRBS to focus exclusively on experiences that had occurred since joining the military and during the past 12 months (lifetime experience of physical abuse is no longer asked). These items, with their focus on experiences during military service tenure, have implications for policy or other interventions to address service members' experiences of physical abuse in the context of their military service.

Key findings from the 2018 HRBS reserve component include:

- Overall, 3.8 percent (95-percent CI: 3.4–4.2) of reserve component service members responded that they had experienced physical assault since joining the military, and 0.7 percent (95-percent CI: 0.5–0.9) had experienced physical assault within the past 12 months. By comparison, in the general population, approximately 1.7 percent of individuals ages 12 and older reported experiencing a physical assault in the past year (Morgan and Kena, 2018).
- There were statistically significant differences across service branches, such that rates of physical assault since joining the military were highest among the Navy Reserve (5.3 percent; 95-percent CI: 3.9–6.6) and lowest among the Air National Guard (2.6 percent; 95-percent CI: 2.0–3.1). Branches did not differ with respect to rates of physical assault in the past year (Table 6.13).
- Rates of physical assault also differed by pay grade. With respect to physical assault since joining the military, warrant officers experienced the highest rates (6.0 percent; 95-percent CI: 3.3–8.7) and junior enlisted (E1–E4) service members experienced the lowest rates (2.4 percent; 95-percent CI: 1.6–3.1; Table 6.14).
- Women's responses indicated significantly higher rates of physical assault since joining the military (5.8 percent; 95-percent CI: 4.9–6.7) and in the past year (1.2 percent; 95-percent CI: 0.6–1.8; Table 6.15) compared with men (respectively, 3.3 percent [95-percent CI: 2.8–3.8] and 0.5 percent [95-percent CI: 0.3–0.8]).

Table 6.13
Physical Assault, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Physically assaulted since joining the military	2.9%[f] (2.1–3.7)	2.6%[c,d,f] (2.0–3.1)	4.1%[b] (3.3–5.0)	4.0%[b] (3.2–4.8)	3.3% (1.6–4.9)	5.3%[a,b] (3.9–6.6)	3.0% (1.3–4.8)	4.0% (3.4–4.5)	3.7% (3.1–4.3)	3.8% (3.4–4.2)
Physically assaulted in the past 12 months[z]	0.2% (0.03–0.4)	0.6% (0.3–0.9)	0.7% (0.3–1.2)	0.8% (0.4–1.2)	0.6% (0.0–1.6)	0.6% (0.1–1.1)	0.6% (0.0–1.4)	0.6% (0.3–0.9)	0.7% (0.4–1.1)	0.7% (0.5–0.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.14
Physical Assault, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Physically assaulted since joining the military	2.4%[b,c,d] (1.6–3.1)	5.1%[a] (4.3–5.9)	5.6%[a,f] (4.7–6.4)	6.0%[a] (3.3–8.7)	3.7% (2.3–5.0)	3.6%[c] (2.8–4.4)
Physically assaulted in the past 12 months[x]	0.9% (0.5–1.4)	0.6% (0.4–0.9)	0.5% (0.2–0.7)	0.3% (0.0–0.9)	0.3% (0.04–0.5)	0.2% (0.0–0.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Table 6.15
Physical Assault, by Gender

	Men	Women
Physically assaulted since joining the military	3.3%[a] (2.8–3.8)	5.8% (4.9–6.7)
Physically assaulted in the past 12 months	0.5%[a] (0.3–0.8)	1.2% (0.6–1.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Suicide

Reduction in the suicide rate is one of the mental health status improvement goals of HP2020. Specifically, HP2020 set the goal of a 10-percent reduction in the suicide rate relative to the 2007 rate of 11.3 suicides per 100,000 population (i.e., a reduction to 10.2 suicides per 100,000 population; Healthy People, 2020g). However, suicide rates in the United States have consistently risen over the past two decades (Stone et al., 2018). According to the most recent CDC data, there was a 33-percent increase in the national age-adjusted suicide rate between 1999, when there were 10.5 suicides per 100,000 population, and 2017, when there were 14.0 suicides per 100,000 population (Curtin and Hedegaard, 2019).

Recent reports of increased rates of suicide among military personnel (e.g., Ramchand, Acosta, et al., 2011) have garnered considerable attention and have spurred significant investments by DoD, the VA, and external organizations into research and prevention efforts (Ramchand, Eberhart, et al., 2014). The 2016 Department of Defense Suicide Event Report found that the suicide mortality rate among reserve component service members (17.6 suicide deaths per 100,000 people) was statistically similar to rates of suicide among the general population, when adjusting for demographic characteristics, and found no evidence of change in sui-

cide rates among reserve service members since 2011. However, this study also found that the adjusted suicide mortality rate for individuals in the Air and Army National Guard (combined) was higher than that observed in the general U.S. population (Pruitt et al., 2018).

Assessing service members' experiences with suicidal ideation and suicide behaviors is critical for informing resource allocation and identifying key targets for prevention programs. Thoughts of suicide are strongly associated with psychological conditions, such as depression, and can be a precursor to death by suicide (Bryan, Bryan, et al., 2014; Franklin et al., 2017). Although correlations between suicidal ideation and suicide are not particularly strong (Nock et al., 2008; Franklin et al., 2017), suicidal ideation is one of the most common reasons for psychiatric hospitalization (Bowers, 2005), and individuals are likely to have thought about suicide prior to an attempt (Jobes and Joiner, 2019). Suicide attempts are important to measure because although most attempts do not result in death (Crosby et al., 2011; Han, Kott, et al., 2016), past attempts are robustly associated with future suicide death (Harris and Barraclough, 1997). In addition, treatments for individuals who have attempted suicide can significantly reduce the likelihood of subsequent attempts in civilian samples (Brown et al., 2005; Gysin-Maillart et al., 2016), as well as military personnel (Bryan, Mintz, et al., 2017).

The 2018 HRBS used methods consistent with the prior 2015 HRBS and with methods used in the NSDUH, the primary federal survey for assessing mental health problems in the U.S general population. Respondents were asked (1) whether they had *seriously thought about* trying to kill themselves in the past 12 months (i.e., suicidal ideation), (2) whether they had *made any plans* to kill themselves in the past 12 months, and (3) whether they *made any attempts* to kill themselves in the past 12 months. Items were modified from the 2015 HRBS to focus exclusively on experiences during the past 12 months and map directly to questions from the NSDUH.

Key findings from the 2018 HRBS reserve component include the following:

- In the 2018 HRBS, 6.0 percent (95-percent CI: 5.4–6.6) of all reserve component service members endorsed having thoughts of suicide in the past 12 months, 2.0 percent (95-percent CI: 1.6–2.4) reported suicide plans, and 0.9 percent (95-percent CI: 0.6–1.3) reported a suicide attempt (Table 6.16). By comparison, the 2018 NSDUH found that, among adults aged 18 or older in the general population, 4.3 percent endorsed thoughts of suicide, 1.3 percent endorsed suicide plans, and 0.6 percent reported a suicide attempt (Substance Abuse and Mental Health Services Administration, 2019b).
- Prevalence of suicidal ideation, plans, and attempts varied across service branches (Table 6.16). Rates of suicidal ideation were highest among the Army Reserve (6.2 percent; 95-percent CI: 5.0–7.4), Army National Guard (7.5 percent; 95-percent CI: 6.4–8.7) and Marine Corps Reserve (8.5 percent; 95-percent CI: 5.1–11.9) and lowest among the Air Force Reserve (2.5 percent; 95-percent CI: 1.7–3.2), Air National Guard (2.8 percent; 95-percent CI: 2.1–3.6), and Coast Guard Reserve (1.4 percent; 95-percent CI: 0.2–2.5). Patterns differed slightly for rates of suicide plans and attempts across branches, with the lowest rates typically observed for the Air Force Reserve and the highest rates observed for the Army National Guard for these outcomes (Table 6.16).
- Rates of suicidal ideation, suicide plans, and suicide attempts also varied significantly by pay grade. With respect to suicidal thoughts, junior enlisted (E1–E4) service members showed the highest rates (7.2 percent; 95-percent CI: 6.0–8.4) compared with individuals in other pay grades, and senior officers showed the lowest rates (3.1 percent; 95-percent

Table 6.16
Suicide, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Suicidal ideation, past 12 months	2.5%[c,d,e,f] (1.7–3.2)	2.8%[c,d,e] (2.1–3.6)	6.2%[a,b,g] (5.0–7.4)	7.5%[a,b,g] (6.4–8.7)	8.5%[a,b,g] (5.1–11.9)	4.9%[a] (3.5–6.2)	1.4%[c,d,e] (0.2–2.5)	5.5% (4.7–6.2)	6.4% (5.5–7.3)	6.0% (5.4–6.6)
Suicide plan, past 12 months	0.8%[d] (0.4–1.2)	0.8%[c,d] (0.4–1.2)	1.9%[b] (1.3–2.6)	2.8%[a,b] (2.0–3.6)	2.8% (0.6–4.9)	1.1% (0.4–1.7)	0.8% (0.0–1.8)	1.7% (1.2–2.1)	2.3% (1.7–2.9)	2.0% (1.6–2.4)
Suicide attempt, past 12 months	0.1%[c,d] (0.02–0.3)	0.3%[c] (0.1–0.5)	1.4%[a,b] (0.8–2.1)	1.1%[a] (0.5–1.8)	0.8% (0.0–1.9)	0.4% (0.1–0.6)	0.5% (0.0–1.4)	0.9% (0.6–1.3)	0.9% (0.5–1.4)	0.9% (0.6–1.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

CI: 2.4–3.9). Similar patterns were observed for suicide plans and suicide attempts in the past 12 months (Table 6.17).

- Women reported significantly higher rates of suicidal ideation in the past 12 months (7.4 percent; 95-percent CI: 6.3–8.6) compared with men (5.6 percent; 95-percent CI: 4.9–6.3). However, women and men did not differ significantly with respect to suicide plans or attempts in the past year (Table 6.18).

Table 6.17
Suicide, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Suicidal ideation, past 12 months	7.2%[c,f] (6.0–8.4)	6.0%[c,f] (5.0–6.9)	4.2%[a,b] (3.4–5.0)	3.7% (1.5–5.9)	4.9% (3.4–6.4)	3.1%[a,b] (2.4–3.9)
Suicide plan, past 12 months	2.5%[c,f] (1.7–3.3)	1.8% (1.3–2.4)	1.2%[a] (0.8–1.5)	1.8% (0.04–3.5)	1.9% (0.9–3.0)	1.0%[a] (0.6–1.4)
Suicide attempt, past 12 months	1.4%[c,e,f] (0.8–2.1)	0.8% (0.4–1.2)	0.5%[a] (0.2–0.8)	0.4% (0.0–1.0)	0.2%[a] (0.02–0.4)	0.1%[a] (0.0–0.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.18
Suicide, by Gender

	Men	Women
Suicidal ideation, past 12 months	5.6%[a] (4.9–6.3)	7.4% (6.3–8.6)
Suicide plan, past 12 months[z]	1.9% (1.4–2.4)	2.5% (1.8–3.1)
Suicide attempt, past 12 months[z]	1.0% (0.6–1.4)	0.8% (0.5–1.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Problematic Gambling

Many forms of gambling, including lottery tickets, casino games, internet poker, and sports betting, have become increasingly accessible and legal in the United States (St-Pierre et al., 2014). The widening availability of gambling raises concerns about problem gambling, a general term used to describe gambling behavior that results in adverse consequences for an individual, and gambling disorder, a psychiatric disorder characterized by loss of control over gambling behavior and serious functional impairments. Gambling disorder is defined in the DSM-5 (American Psychiatric Association, 2013) as "persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress." To meet diagnostic criteria for gambling disorder, a person must have at least four symptoms from of a list of nine, which include needing to gamble with increasingly large amounts of money, repeated unsuccessful attempts to stop gambling, lying to conceal one's gambling behavior, and preoccupation with thoughts of gambling. Both problem gambling and gambling disorder are associated with other problem behaviors and adverse life events, including substance use (Peters et al., 2015), psychiatric comorbidity (Stefanovics, Potenza, and Pietrzak, 2017), partner violence (Afifi et al., 2010), and suicidal behaviors (Moghaddam et al., 2015).

Concern with problem gambling and gambling disorder in the military has been raised by evidence that service members are at high risk (Steenbergh et al., 2008; Levy and Tracy, 2018). A study examining problematic gambling in a sample of Army National Guard members found that approximately 8 percent of service members met criteria for lifetime problematic gambling (Gallaway et al., 2019), which is significantly higher than rates observed in the general population (5 percent; Welte et al., 2015). In addition, a recent report by the Government Accountability Office recommended that DoD include screening questions for gambling disorder in existing, systematic data collection efforts (e.g., PHA, HRBS; U.S. Government Accountability Office, 2017). In response to these concerns, the 2018 National Defense Authorization Act[1] mandated screening of active-duty service members for gambling disorder. Specifically, the law states that "the Secretary of Defense shall incorporate medical screening questions specific to gambling disorder into the Annual Periodic Health Assessments of members of the Armed Forces conducted by the Department of Defense during the one-year period beginning 180 days after the date of the enactment of this Act." At the time of this report, implementation of this new policy was ongoing. It is also worth noting that, as written, the NDAA language would only include activated reservists.

In the 2018 HRBS, problem gambling was assessed using the Lie-Bet screening questionnaire, which consists of two items, one about lying (i.e., "lie to people important to you about how much you gambled") and one item about betting (i.e., "feeling a need to bet more and more money") (Johnson et al., 1997). Methodological studies of the Lie-Bet questionnaire have found it to be a valid instrument for identifying problem gambling and gambling disorder (Johnson, Hamer, and Nora, 1998; Dowling et al., 2018). In this report, we refer to people who screen positive on the Lie-Bet as having a gambling problem, but it should be understood that there is a wide range of severity among this group, with many also meeting more-stringent criteria for gambling disorder.

Key results from the 2018 HRBS reserve component include the following:

- The prevalence of gambling problems among reserve component service members was 1.7 percent (CI: 1.4–2.1; Table 6.19). This is lower than an estimate of the prevalence

[1] H.R. 5515—John S. McCain National Defense Authorization Act for Fiscal Year 2019.

Table 6.19
Past-Year Gambling Problem, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Past-year gambling problem	0.6%[d,f] (0.2–0.9)	0.6% [d,f] (0.3–0.9)	1.5% (0.9–2.0)	2.3%[a,b] (1.6–3.1)	2.2% (0.6–3.8)	2.4% [a,b] (1.3–3.5)	1.2% (0.2–2.3)	1.5% (1.1–1.9)	1.9% (1.3–2.5)	1.7% (1.4–2.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

of problem gambling in the U.S civilian population conducted in the early 2000s of 2.3 percent (Kessler, Hwang, et al., 2008). The prevalences in the Army National Guard and Navy Reserve were significantly higher than in the Air Force Reserve and the Air National Guard.

- Problem gambling was significantly more prevalent among enlisted ranks than among O4–O6 (Table 6.20).
- Men were more likely to have problem gambling than women. Studies in the civilian population also found higher prevalence of problem gambling among men than women (Blanco et al., 2006; Table 6.21).
- Problem gambling was significantly more prevalent among those age 17–24 (2.6 percent; 95-percent CI: 1.5–3.8) than among those age 45 or older (1.0 percent; 95-percent CI: 0.7–1.3; Appendix Table D.56). Studies in the civilian population also found that problematic gambling was more prevalent among younger than older people (Volberg, McNamara, and Carris, 2018; Alegria et al., 2009).

Table 6.20
Past-Year Gambling Problem, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Past-year gambling problem	2.2%[f] (1.4–3.0)	1.7% (1.2–2.2)	1.3% (0.9–1.8)	2.2% (0.2–4.3)	0.8% (0.1–1.5)	0.7%[a] (0.4–1.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.21
Past-Year Gambling Problem, by Gender

	Men	Women
Past-year gambling problem	1.9%[a] (1.4–2.4)	1.1% (0.7–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Mental Health Services

There is a longstanding concern across military services with low levels of use of mental health services (Hom et al., 2017). Similar concerns regarding the civilian population (Olfson, Blanco, and Marcus, 2016) are reflected in the HP2020 goals of increasing utilization of mental health services by individuals with serious mental illness or major depression (Healthy People, 2020h; Healthy People, 2020i). Although use of mental health services has increased over time, there remains a large proportion of individuals with mental health treatment needs who do not receive treatment (Kim, Thomas, et al., 2010; Quartana et al., 2014). This pattern is not unique to the U.S. military; similar findings have been reported from studies of military samples from the UK (Iversen et al., 2010) and Canada (Sareen et al., 2007). A better understanding of the patterns of mental health service use and the barriers faced by those who seek care can help guide policy to reduce unmet need for treatment.

In this section, we present results from the HRBS regarding the use of mental health services by reserve component service members, examining not only the prevalence of use but also the location, type, and frequency of care. It is important to note that reserve component service members access health care through a variety of health care systems, in contrast with active component service members, who are likely to receive care through the MHS. Some reserve component service members have access to the MHS, but they usually have access only for a short period of time following deployment. Reserve component service members may receive care from VA facilities, if they qualify, and they are also likely to use civilian services, especially if they are covered through employer-based health insurance. The information collected in the HRBS on the amount and type of care received enables us to describe patterns of mental health services use in detail.

Reserve component service members can face distinct barriers to treatment as a result of the different conditions under which they seek care. The civilian health care system is less integrated and can require more expense and travel time, which could lead to lower levels of utilization. On the other hand, reserve component service members might be less concerned that seeking treatment would impact their military careers because the military would not have direct access to their health records. One study of service members who recently returned from combat deployment in Iraq found that those in the reserve component had lower mental health stigma and were more likely to receive mental health treatment than those in the active component (Kim, Thomas, et al., 2010).

The HRBS also collects information on perceived unmet need for mental health treatment and the reasons that people who either perceive a need for treatment or have a high level of psychological distress do not receive mental health treatment. Among the civilian population, research suggests that barriers to care, including stigma, cost, and inconvenience, contribute to low use of mental health services (Mojtabai et al., 2011), and research suggests similar patterns of undertreatment among both reserve and active component service members (Kim, Thomas, et al., 2010). Service members are impacted by the same barriers that affect the general population, such as low perception of need (Hom et al., 2017) and stigma related to mental health treatment (Kim, Thomas, et al., 2010; Quartana et al., 2014). However, service members also face barriers that are specific to the military context, including practical barriers in scheduling appointments (Kim, Thomas, et al., 2010) and concern that seeking mental health

treatment might have a negative impact on one's military career (Hoge, Castro, et al., 2004). Understanding barriers to treatment that reserve component service members face is important for designing policies to ensure that they are able to access the care they need.

To address these issues, the 2018 HRBS asked a series of questions designed to investigate the following:

- whether and how much mental health services were used (counseling, therapy, or other mental health treatment)
- what types of providers delivered the services (mental health specialist, general medical doctor, civilian clergyperson or military chaplain, support group, other)
- where services were obtained (MHS or civilian sector)[2]
- whether mental health services were needed but not received (perceived by self)
- common reasons service members who perceived a need to receive services did not actually receive them (e.g., lack of transportation, concerns about what others will think)
- whether service members believed that obtaining mental health services would damage their military career.

Mental Health Service Utilization

Tables 6.22 through 6.24 show the percentage of reserve component service members who reported using mental health services in the past 12 months from various sources (in both military and civilian health systems). A useful comparison can be drawn between these results and those from the NSDUH. In the 2018 NSDUH, the prevalence of any mental health service use was 15.2 percent among adults age 18 to 25 and 16.1 percent among adults age 26 to 49 (Substance Abuse and Mental Health Services Administration, 2019b). In comparing the HRBS with the NSDUH results, it is important to keep in mind that the NSDUH sample is evenly divided between men and women, while the HRBS sample, reflecting the reserve component population, is approximately 80 percent men. Because women use mental health services at a higher rate than men (Han, Olfson, et al., 2017), we would expect the prevalence of service use to be higher in the NSDUH than in the HRBS.

Key findings regarding use of mental health services in the HRBS include the following:

- Overall, 21.0 percent (95-percent CI: 20.1–21.9) of reserve component service members reported using any mental health services (Table 6.22). This proportion was higher than that found in the general population in the NSDUH.
- Use of any mental health service varied significantly across service branches, with the Army Reserve, Army National Guard, and the Navy Reserve all having significantly higher use than the Air Force Reserve and the Air National Guard (Table 6.22).
- Reserve component members were about equally likely to receive mental health services from specialty mental health providers (13.5 percent; 95-percent CI: 12.7–14.2) as from general medical providers (12.7 percent; 95-percent CI: 11.9–13.4). This pattern is different from that in the general population, where the majority of individuals who receive mental health care receive that care exclusively from general medical providers (Olfson

[2] The survey does not differentiate between care from a civilian provider that is and is not covered by TRICARE (i.e., purchased care).

et al., 2019). Differences in prevalence of care across service branches were similar for specialty and nonspecialty care.

- The percentage of service members who consulted a clergy member for a mental health problem but did not receive any medical care for a mental health problem was 2.3 percent (95-percent CI: 1.9–2.6). This percentage did not differ across service branches. This finding is similar to a study of recently deployed service members, 5 percent of whom reported receiving mental health care from "nonproviders," a category that includes clergy members and other nonprofessionals such as fellow service members (Kim, Toblin, et al., 2016).
- The percentage of reserve component service members who received mental health services at a civilian health facility (10.3 percent; 95-percent CI: 9.6–10.9) was higher than that receiving mental health services at a military facility (5.7 percent; 95-percent CI: 5.2–6.2) or a VA facility (5.4 percent; 95-percent CI: 4.8–5.9).
- Use of any mental health services was lower among lower enlisted ranks (18.0 percent; 95-percent CI: 16.3–19.7) and senior officers (19.8 percent; 95-percent CI: 18.2–21.5) than among midgrade (23.5 percent; 95-percent CI: 22.0–25.1) and senior enlisted (25.6 percent; 95-percent CI: 23.9–27.2) ranks (Table 6.23). This pattern was consistent for specialty care and general medical care for mental health problems.
- Use of any mental health services was lower among men (18.9 percent; 95-percent CI: 17.9–20.0) than women (29.1 percent; 95-percent CI: 27.4–30.8; Table 6.24). This pattern was consistent for all locations and types of mental health services with the exceptions of seeing only a clergy member and use of VA services, where there were no differences between men and women. As noted, in the civilian population, women use general health care and mental health care services more commonly than men (Olfson et al., 2019; Bertakis et al., 2000).
- Use of any mental health services was significantly lower among non-Hispanic Asian personnel (16.4 percent; 95-percent CI: 13.4–19.3) than among non-Hispanic black personnel (23.7 percent; 95-percent CI: 21.1–26.3) and Hispanic personnel (23.8 percent; 95-percent CI: 21.0–26.6; Appendix Table D.57). Non-Hispanic Asian personnel were significantly less likely than non-Hispanic black personnel and Hispanic personnel to use all types of mental health services except for clergy. In addition, non-Hispanic Asian personnel were also less likely than non-Hispanic whites to receive care from a specialty mental health provider. There were no differences in prevalence of mental health service use between non-Hispanic white personnel, non-Hispanic black personnel, and Hispanic personnel. This finding is strikingly different from findings in the civilian population, where minority groups are less likely to use mental health services than white personnel (Cook et al., 2018).
- Use of any mental health services was generally higher among older service members and younger service members (Appendix Table D.58).

Table 6.22
Past-Year Mental Health Service Utilization, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any mental health service use in the past year	13.8%[c,d,f] (12.1–15.6)	15.9%[c,d,f] (14.4–17.3)	22.5%[a,b] (20.7–24.3)	23.1%[a,b] (21.4–24.8)	20.1% (14.9–25.3)	22.7%[a,b] (19.9–25.5)	17.1% (12.3–21.8)	20.5% (19.3–21.8)	21.4% (20.1–22.7)	21.0% (20.1–21.9)
Saw mental health provider in the past year	8.4%[c,d,f] (7.0–9.8)	10.7%[c,d,f] (9.4–11.9)	14.7%[a,b] (13.1–16.2)	14.6%[a,b] (13.3–16.0)	11.3% (7.8–14.8)	15.6%[a,b] (13.1–18.1)	12.6% (8.4–16.8)	13.2% (12.2–14.3)	13.7% (12.6–14.8)	13.5% (12.7–14.2)
Saw general medical provider in the past year	8.5%[c,d,f] (7.1–9.9)	8.5%[c,d,f] (7.5–9.6)	13.6%[a,b] (12.1–15.1)	14.2%[a,b] (12.9–15.6)	11.0% (6.4–15.6)	14.0%[a,b] (11.8–16.2)	10.2% (6.4–14.0)	12.4% (11.4–13.4)	12.9% (11.8–14.0)	12.7% (11.9–13.4)
Any mental health services from specialty mental health or medical provider	12.6%[c,d,f] (10.9–14.2)	14.0%[c,d,f] (12.6–15.4)	19.9%[a,b] (18.1–21.6)	20.6%[a,b] (19.0–22.2)	17.5% (12.4–22.6)	21.2%[a,b] (18.4–23.9)	15.0% (10.5–19.5)	18.4% (17.2–19.6)	19.0% (17.8–20.3)	18.7% (17.8–19.6)
Saw clergy, chaplain, or pastor in the past year	4.2%[c,d] (3.2–5.1)	5.3% (4.4–6.2)	6.7%[a] (5.6–7.8)	6.8%[a] (5.8–7.9)	6.7% (4.0–9.5)	5.6% (4.2–7.1)	6.1% (2.7–9.4)	6.0% (5.3–6.7)	6.5% (5.7–7.3)	6.3% (5.7–6.8)
Only saw clergy (no medical) in the past year[z]	1.3% (0.8–1.8)	1.8% (1.3–2.3)	2.6% (1.9–3.3)	2.5% (1.8–3.2)	2.6% (1.0–4.2)	1.6% (1.0–2.2)	2.1% (0.2–4.0)	2.2% (1.8–2.6)	2.4% (1.8–2.9)	2.3% (1.9–2.6)
Mental health services at a military facility (excluding clergy)	4.4%[f] (3.4–5.4)	5.5% (4.5–6.4)	6.4% (5.3–7.4)	5.3% (4.4–6.1)	6.8% (4.1–9.5)	7.6%[a] (5.8–9.3)	4.4% (1.7–7.1)	6.2% (5.5–6.9)	5.3% (4.6–6.0)	5.7% (5.2–6.2)
Mental health services at a VA facility (excluding clergy)	2.8%[c,d] (1.8–3.7)	2.7%[c,d] (2.0–3.3)	7.4%[a,b,f] (6.2–8.5)	6.0%[a,b] (5.1–7.0)	3.1% (1.4–4.9)	4.3%[c] (3.1–5.4)	2.7% (0.5–4.9)	5.5% (4.8–6.2)	5.2% (4.5–6.0)	5.4% (4.8–5.9)

Table 6.22—continued

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Mental health services at a civilian facility (excluding clergy)	7.6%[d] (6.3–9.0)	8.5%[d] (7.3–9.6)	10.3% (9.0–11.6)	11.6%[a,b] (10.3–12.8)	7.5% (4.8–10.2)	10.7% (8.7–12.7)	9.9% (6.4–13.4)	9.6% (8.7–10.4)	10.8% (9.9–11.8)	10.3% (9.6–10.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.23
Past-Year Mental Health Service Utilization, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any mental health service use in the past year	18.0%[b,c] (16.3–19.7)	23.5%[a,f] (22.0–25.1)	25.6%[a,f] (23.9–27.2)	21.0% (16.6–25.3)	22.1% (19.4–24.8)	19.8%[b,c] (18.2–21.5)
Saw mental health provider in the past year	10.4%[b,c] (9.1–11.8)	16.3%[a,f] (15.0–17.7)	17.4%[a,f] (16.0–18.8)	13.1% (9.7–16.6)	14.0% (11.6–16.4)	12.8%[b,c] (11.4–14.1)
Saw general medical provider in the past year	11.0%[b,c] (9.6–12.4)	14.5%[a,e,f] (13.3–15.8)	16.7%[a,e,f] (15.2–18.1)	12.0% (8.8–15.2)	10.7%[b,c] (8.8–12.7)	10.7%[b,c] (9.4–12.0)
Any mental health services from specialty mental health or medical provider	15.7%[b,c] (14.1–17.4)	21.3%[a,f] (19.9–22.8)	23.5%[a,f] (21.9–25.1)	18.9% (14.7–23.0)	19.1% (16.5–21.6)	17.4%[b,c] (15.8–18.9)
Saw clergy, chaplain, or pastor in the past year	5.4%[e] (4.4–6.5)	6.6% (5.7–7.5)	6.8% (5.9–7.7)	5.5% (3.0–7.9)	8.3%[a] (6.5–10.0)	7.1% (6.0–8.2)
Only saw clergy (no medical) in the past year[z]	2.2% (1.6–2.9)	2.2% (1.6–2.7)	2.1% (1.5–2.6)	2.1% (0.4–3.8)	3.1% (2.0–4.1)	2.4% (1.8–3.1)
Mental health services at a military facility (excluding clergy)	4.2%[b,c,f] (3.3–5.1)	6.6%[a,c] (5.8–7.5)	9.3%[a,b,e,f] (8.2–10.4)	5.9% (3.4–8.5)	4.3%[c] (3.2–5.5)	6.4%[a,c] (5.4–7.4)
Mental health services at a VA facility (excluding clergy)	3.4%[b,c,d] (2.6–4.3)	8.1%[a,e,f] (7.1–9.2)	7.1%[a,e,f] (6.1–8.1)	8.0%[a,e,f] (5.3–10.7)	3.5%[b,c,d] (2.3–4.7)	3.6%[b,c,d] (2.8–4.3)
Mental health services at a civilian facility (excluding clergy)	9.4%[c] (8.1–10.7)	10.2% (9.1–11.2)	12.3%[a] (11.1–13.6)	10.6% (7.4–13.7)	12.6% (10.3–14.8)	10.1% (8.8–11.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.24
Past-Year Mental Health Service Utilization, by Gender

	Men	Women
Any mental health service use in the past year	18.9%[a] (17.9–20.0)	29.1% (27.4–30.8)
Saw mental health provider in the past year	12.2%[a] (11.3–13.0)	18.6% (17.2–20.0)
Saw general medical provider in the past year	11.3%[a] (10.5–12.2)	17.9% (16.5–19.3)
Any mental health services from specialty mental health or medical provider	16.8%[a] (15.8–17.8)	26.1% (24.5–27.8)
Saw clergy, chaplain, or pastor in the past year	5.8%[a] (5.2–6.4)	8.2% (7.1–9.3)
Only saw clergy (no medical) in the past year[z]	2.1% (1.7–2.5)	2.9% (2.1–3.8)
Mental health services at a military facility (excluding clergy)	5.0%[a] (4.4–5.6)	8.5% (7.5–9.4)
Mental health services at a VA facility (excluding clergy)[z]	5.4% (4.8–6.0)	5.2% (4.4–5.9)
Mental health services at a civilian facility (excluding clergy)	8.8%[a] (8.0–9.5)	16.0% (14.7–17.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Tables 6.25 through 6.27 present results regarding use of medications for mental health treatment. In the civilian population, about 12.2 percent of adults age 18 and over reported using a prescription medication for a mental health problem in the past year, making medication the most commonly received form of mental health treatment (Substance Abuse and Mental Health Services Administration, 2019b).

- The prevalence of use of medication for mental health treatment in the past year was 8.2 percent (95-percent CI: 7.6–8.8) among service members in the reserve component (Table 6.25). The prevalence of medication use was significantly higher in the Army Reserve and Army National Guard than in the Air Force Reserve, the Air National Guard, and the Marine Corps Reserve.
- The percentage reporting use of medication for a mental health condition was higher among E5–E6 and E7–E9 pay grades than among junior enlisted and senior officer pay grades (Table 6.26).
- Men were less likely than women to use medication for mental health conditions (Table 6.27).

Table 6.25
Past-Year Mental Health Medication Use, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Use of medications for a mental health problem	4.7%[c,d,f] (3.7–5.8)	5.5%[c,d] (4.6–6.4)	9.2%[a,b,e] (8.0–10.4)	9.8%[a,b,e] (8.6–11.0)	3.1%[c,d,f] (1.6–4.6)	8.0%[a,e] (6.2–9.8)	5.6% (3.0–8.2)	7.5% (6.7–8.2)	8.8% (7.9–9.7)	8.2% (7.6–8.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 6.26
Past-Year Mental Health Medication Use, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Use of medications for a mental health problem	6.0%[b,c,d] (4.9–7.0)	10.5%[a,f] (9.4–11.6)	11.0%[a,f] (9.8–12.1)	10.1%[a] (7.1–13.2)	7.5% (5.7–9.3)	7.4%[b,c] (6.3–8.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.27
Past-Year Mental Health Medication Use, by Gender

	Men	Women
Use of medications for a mental health problem	7.1%[a] (6.5–7.8)	12.3% (11.0–13.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Tables 6.28 through 6.30 show results regarding the average number of mental health visits over the past 12 months for respondents that received mental health treatment.

- The overall average number of visits during the past year was 9.7 (95-percent CI: 9.0–10.5) among reserve component service members who used services (Table 6.28). This average did not vary significantly across services or by pay grade (Table 6.29).
- Women who used services had, on average, slightly more visits in the past year than men (Table 6.30).
- Among the youngest category of service members, those aged 17–24, the average number of visits for those who used services was lower than among all older age groups (Appendix Table D.62).

Table 6.28
Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Service Branch

	Air Force Reserve n = 298	Air National Guard n = 513	Army Reserve n = 876	Army National Guard n = 1,176	Marine Corps Reserve n = 117	Navy Reserve n = 365	Coast Guard Reserve n = 58	Reserve Total n = 1,714	National Guard Total n = 1,689	Total N = 3,403
Mean number of mental health visits[z]	8.9 (6.7–11.0)	10.0 (8.2–11.9)	10.3 (9.0–11.7)	9.7 (8.4–10.9)	9.9 (6.7–13.1)	8.3 (6.7–9.8)	9.5 (6.5–12.5)	9.7 (8.8–10.7)	9.7 (8.7–10.8)	9.7 (9.0–10.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.29
Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Pay Grade

	E1–E4 n = 574	E5–E6 n = 1,037	E7–E9 n = 855	W1–W5 n = 102	O1–O3 n = 308	O4–O6 n = 527
Mean number of mental health visits[z]	8.4 (7.0–9.8)	11.1 (9.7–12.6)	10.0 (8.9–11.2)	8.3 (5.8–10.8)	9.8 (7.9–11.7)	9.4 (8.1–10.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.30
Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Gender

	Men n = 1,899	Women n = 1,504
Mean number of mental health visits	9.3[a] (8.4–10.2)	10.9 (9.7–12.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate ($p < 0.05$).

Perceived Unmet Need for Mental Health Services

One of the ways that unmet need for mental health treatment can be measured is through questions about respondents' own perceptions of their needs. The 2018 HRBS included a question about whether the respondent felt that that he or she needed mental health care in the past 12 months and did not receive it. It is important to note that respondents who endorse this item might have received some care and still thought that they needed more or different care. Tables 6.31 through 6.33 summarize results regarding perceived unmet need for mental health treatment.

- The percentage of all reserve component service members reporting unmet need for mental health treatment in the past year was 4.6 percent (95-percent CI: 4.1–5.0; Table 6.31).
- Perceived unmet need did not differ across pay grades (Table 6.32).
- Men were significantly less likely to report perceived unmet need than women (Table 6.33).
- There were no significant differences in perceived unmet need across racial/ethnic groups or age groups (Appendix Tables D.63 and D.64).

Table 6.31
Perceived Unmet Need for Mental Health Services, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Perceived unmet need for mental health services	2.2%[c,d,f] (1.5–3.0)	3.1%[d] (2.4–3.8)	4.7%[a] (3.8–5.6)	5.6%[a,b] (4.7–6.5)	3.7% (1.6–5.9)	4.4%[a] (3.1–5.7)	3.2% (1.0–5.4)	4.0% (3.5–4.6)	5.0% (4.3–5.7)	4.6% (4.1–5.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 6.32
Perceived Unmet Need for Mental Health Services, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Perceived unmet need for mental health services[z]	4.5% (3.6–5.4)	5.3% (4.4–6.1)	4.1% (3.4–4.9)	3.3% (1.8–4.8)	3.8% (2.5–5.0)	3.6% (2.9–4.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.33
Perceived Unmet Need for Mental Health Services, by Gender

	Men	Women
Perceived unmet need for mental health services	3.9%[a] (3.3–4.4)	7.2% (6.2–8.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Reasons for Not Seeking Care

To understand potential policy strategies that can increase treatment utilization, the HRBS asked about the reasons that people did not receive mental health treatment. This question was asked of two groups of respondents who had indications of need for treatment. One group asked this question was the group that indicated that they perceived a need for treatment that they did not receive. This group of individuals had decided that they might need treatment, and yet they did not receive it. The other group was composed of people who indicated a moderate or higher level of psychological distress on our measure of clinically significant psychological distress, the K6, and did not receive treatment. This group had a level of distress suggesting a need, regardless of whether they themselves though that they should seek treatment. Table 6.34 shows the proportion of this group that endorsed each of the potential reasons for not seeking care.

- The most common reason for not seeking care was not thinking that it was needed. This is consistent with findings from the civilian literature suggesting that low perceived need for treatment is the most common reason that people with mental health problems do not seek care (Mojtabai, Olfson, and Mechanic, 2002). The third most common reason, not thinking treatment would help, is closely related.
- Many of the most commonly endorsed reasons for not receiving mental health care are related to potential adverse professional and interpersonal consequences of seeking care. These include "It would have harmed my career," "Members of my unit might have less confidence in me," and "My supervisor/unit leadership might have a negative opinion of me or treat me differently."

Table 6.34
Reasons for Not Receiving Needed Treatment for Mental Health Problems in the Past Year

	%	95% CI
I did not think I needed it	55.8	51.6–60.0
It would have harmed my career	38.1	34.8–41.5
I did not think treatment would help	33.3	30.0–36.6
Members of my unit might have less confidence in me	29.2	26.0–32.3
It was too difficult to get time off work for treatment	27.1	24.1–30.1
My supervisor/unit leadership might have a negative opinion of me or treat me differently	27.5	24.5–30.6
I was concerned that the information I gave the counselor might not be kept confidential	28.1	25.0–31.1
It was too difficult to schedule an appointment	27.6	24.6–30.6
I could have been denied security clearance in the future	28.0	25.0–31.1
It would have negatively affected my family life	18.8	16.1–21.5
I did not know where to get help	21.8	18.6–24.9
My commanders or supervisors discourage the use of mental health services	7.2	5.2–9.3
I could not afford the cost	24.5	21.4–27.6
It was too difficult to get childcare	7.9	6.0–9.8

- Practical problems in seeking care were also commonly endorsed. The most commonly endorsed practical problems with seeking care were "It was too difficult to get time off work for treatment" and "It was too difficult to schedule an appointment." These responses suggest that the process of seeking care is a challenge, both with respect to finding time away from one's duties to seek care and with respect to the ease of use of the MHS.

Concern That Mental Health Treatment Would Damage a Military Career

Prior studies have found that service members are concerned about the impact that seeking mental health care would have on their career in the military (Hoge, Castro, et al., 2004). In the 2018 HRBS, respondents were asked: "In general, do you think it would damage a person's military career if the person were to seek counseling or mental health therapy/treatment through the military, regardless of the reason for seeking counseling?" The importance of this question is that it identifies a specific barrier to mental health treatment use that might be addressed through military policy. Tables 6.35 through 6.37 report results of this item.

- The proportion of respondents who endorsed the idea that seeking mental health treatment would damage a person's military career was 29.9 percent (95-percent CI: 28.8–30.9). This proportion did not differ significantly across branches (Table 6.35).
- The proportion reporting this belief was significantly lower among junior enlisted personnel than all other pay grades. (Table 6.36).

Table 6.35
Perception That Seeking Mental Health Treatment Would Damage Military Career, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Seeking mental health treatment would damage military career[z]	32.2% (29.7–34.7)	31.2% (29.2–33.2)	28.9% (26.8–31.1)	29.3% (27.4–31.1)	32.7% (27.0–38.3)	30.0% (26.8–33.1)	27.7% (22.0–33.3)	30.1% (28.6–31.5)	29.7% (28.2–31.2)	29.9% (28.8–30.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 6.36
Perception That Seeking Mental Health Treatment Would Damage Military Career, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Seeking mental health treatment would damage military career	25.5%[b,c,d,e,f] (23.5–27.5)	32.1%[a] (30.4–33.8)	33.9%[a] (32.1–35.6)	36.8%[a] (31.0–42.6)	32.7%[a] (29.7–35.8)	35.2%[a] (33.2–37.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 6.37
Perception That Seeking Mental Health Treatment Would Damage Military Career, by Gender

	Men	Women
Seeking mental health treatment would damage military career	29.4%[a] (28.2–30.7)	31.6% (29.9–33.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

- Endorsement of this belief was significantly more prevalent among women than men (Table 6.37), though this difference was small in magnitude.
- The perception that seeking mental health treatment would damage their military career was significantly less prevalent among the youngest age group than among all other age groups (Appendix Table D.66).

Comparisons with the 2018 HRBS Active Component Sample

Table 6.38 presents comparisons of the key outcomes in this chapter between service members in the reserve and active components. Recall that RRs and ARRs greater than 1.0 indicate that the reserve component has higher prevalence rates than the active component, whereas RRs and ARRs below 1.0 indicate that the reserve component has lower prevalence rates than the active component. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Table 6.38
Rates of Mental Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Mental health status		
Serious psychological distress		
Past-month serious psychological distress	0.68*** (0.59, 0.77)	0.69*** (0.6, 0.8)
Past-year serious psychological distress	0.65*** (0.59, 0.72)	0.65*** (0.59, 0.73)
Probable PTSD	0.91** (0.83, 0.99)	0.75*** (0.68, 0.83)
Social and emotional factors associated with mental health		
Angry or aggressive behavior		
Any angry or aggressive behavior in past 30 days	0.95** (0.92, 0.99)	0.95** (0.92, 0.99)
Angry or aggressive behavior 5+ times in past 30 days	0.87** (0.76, 0.99)	0.89 (0.77, 1.03)
Unwanted sexual contact		
Unwanted sexual contact since joining the military	0.81*** (0.74, 0.9)	0.74*** (0.67, 0.82)
Unwanted sexual contact in the past 12 months	0.63*** (0.49, 0.81)	0.62*** (0.47, 0.82)
Physical assault		
Physically assaulted since joining the military	0.72*** (0.62, 0.83)	0.61*** (0.52, 0.73)
Physically assaulted in the past 12 months	0.61** (0.41, 0.92)	0.58** (0.36, 0.96)
Gambling		
Past-year gambling problem	1.11 (0.84, 1.47)	1.13 (0.83, 1.53)
Suicide		
Suicidal thoughts in the past 12 months	0.72*** (0.63, 0.83)	0.72*** (0.62, 0.84)
Suicide plans in the past 12 months	0.74** (0.58, 0.94)	0.74** (0.56, 0.98)
Suicide attempt in the past 12 months	0.75 (0.49, 1.16)	0.63* (0.38, 1.05)
Mental health services		
Perceived unmet need for mental health services in the past year	0.67*** (0.58, 0.77)	0.59*** (0.50, 0.69)
Any mental health service use in the past year	0.82*** (0.78, 0.88)	0.72*** (0.67, 0.77)

Table 6.38—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Saw mental health provider in the past year	0.74*** (0.69, 0.8)	0.62*** (0.56, 0.67)
Saw general medical provider in the past year	0.94 (0.86, 1.03)	0.79*** (0.72, 0.88)
Any mental health services from specialty mental health or medical provider	0.84*** (0.78, 0.89)	0.71*** (0.66, 0.77)
Saw clergy, chaplain, or pastor in the past year	0.72*** (0.64, 0.82)	0.70*** (0.61, 0.81)
Only saw clergy (no medical) in the past year	0.74*** (0.60, 0.92)	0.76** (0.59, 0.99)
Mental health services at a military facility (excluding clergy)	0.31*** (0.28, 0.34)	0.27*** (0.24, 0.30)
Mental health services at a VA facility (excluding clergy)	4.36*** (3.32, 5.75)	3.09*** (2.37, 4.03)
Mental health services at a civilian facility (excluding clergy)	2.25*** (2.00, 2.54)	2.01*** (1.77, 2.28)
Total mental health visits in the past year	0.82*** (0.73, 0.91)	0.78*** (0.69, 0.88)
Mental health medications in the past year	0.97 (0.87, 1.08)	0.74**** (0.65, 0.83)
Seeking mental health services would damage military career	0.87*** (0.83, 0.92)	0.89*** (0.85, 0.94)

NOTES: URRs and ARRs above 1.0 indicate that the reserve component had an increased prevalence of the outcome in question compared with the active component; URRs and ARRs below 1.0 indicate that the reserve component had a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade. Low prevalence (i.e., use of mental health services at a VA facility; past-year gambling problem) outcomes collapsed warrant officers and officers into a single group, collapsed DoD occupation code into combat versus noncombat codes, and dropped the interaction between service branch and pay grade and the missing flags for both education level and minority status. For unwanted sexual contact, the exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Mental Health Status

- Reserve component service members demonstrated significantly lower rates of both past-month and past-year serious psychological distress in unadjusted and adjusted models. In the adjusted models, rates of past-month serious psychological distress were about 31 percent lower (ARR = 0.69, CI: 0.60–0.80), and rates of past-year serious psychological distress were about 35 percent lower (ARR = 0.65, CI: 0.59–0.73) among reserve component compared with active component service members (Table 6.38).
- Reserve component service members also had significantly lower rates of probable PTSD compared with active component service members in both unadjusted (RR = 0.91, CI: 0.83–0.99) and adjusted models (ARR = 0.75, CI: 0.68–0.83).

Social and Emotional Factors Associated with Mental Health

- Reserve component service members also differed from active component service members with respect to angry or aggressive behaviors. Reserve component service members were about 5 percent less likely than those in the active component to report any angry or aggressive behaviors in the past 30 days in both unadjusted and adjusted models. Similarly, rates of recurrent angry or aggressive behaviors were lower among the reserve component compared with active component in the unadjusted model (RR = 0.87, CI: 0.76–0.99); however, there no significant difference in recurrent angry or aggressive behaviors across components in the adjusted model.
- Reserve component service members responded that they had experienced significantly lower rates of unwanted sexual contact since joining the military and lower rates of unwanted sexual contact in the past year compared with the active component. In adjusted models, reserve component service members' responses indicated 26-percent lower rates of unwanted sexual contact since joining the military (ARR = 0.74, CI: 0.67–0.82) and 38-percent lower rates of unwanted sexual contact in the past year (ARR = 0.62, CI: 0.47–0.82) compared with service members in the active component.
- Similarly, reserve component service members' responses indicated lower rates of physical assault since joining the military, as well as lower rates of past-year physical assault, compared with active component service members. For example, in adjusted models, the prevalence of physical assault since joining the military was 39 percent lower (ARR = 0.61, CI: 0.52–0.73) and the prevalence of past-year physical assault was 42 percent lower (ARR = 0.58, CI: 0.36–0.96) in the reserve component compared with the active component.

Suicide

- In both unadjusted and adjusted models, reserve component service members showed significantly lower rates of past-year suicidal thoughts and suicide plans compared with the active component. Adjusted models showed approximately 28-percent lower rates of suicidal thoughts (ARR = 0.72, CI: 0.62–0.84) and 26-percent lower rates of suicide plans (ARR = 0.74, CI: 0.56–0.98) among reserve component compared with active component service members. Reserve component service members did not significantly

differ from active component service members with respect to the prevalence of past-year suicide attempts.

Mental Health Care

- Reserve component service members reported statistically significantly lower levels of perceived unmet need for mental health care than active component service members. Perceived need was about 40 percent lower among reserve component than among active component service members.
- In the adjusted models, reserve component service members were about 30 percent less likely than active component service members to use any mental health services. This difference was statistically significant.
- In the adjusted models, reserve component service members were about 70 percent less likely to report use of military health facilities for mental health care in the past year but about three times more likely to use VA facilities[3] and two times more likely to use civilian facilities for mental health care in the past year, compared with active component service members. All of these differences were statistically significant.
- Reserve component service members who received mental health services had statistically significantly fewer visits for treatment in the past year than active component service members.
- Reserve component service members were about 25 percent less likely than active component service members to have used a prescription medication for a mental health condition in the past year. This difference was statistically significant.
- Reserve component service members were about 10 percent less likely than active component service members to endorse the belief that seeking mental health treatment would damage their career in the military. This difference was statistically significant.
- The prevalence of problem gambling in the past year did not differ significantly between reserve component and active component service members.

Summary

Mental health problems, their social and emotional correlates, and their treatment remain complex challenges for the military. Among reserve component service members, the past-month prevalence of psychological distress that was serious enough that treatment was warranted was 6.5 percent, which is higher than rates observed in the general population (2.9 percent to 5.2 percent; Center for Behavioral Health Statistics and Quality, 2018). A similar pattern was observed for probable PTSD: Approximately 11 percent of service members met criteria for probable PTSD, compared with rates of approximately 4 percent in the general population (Kessler, Berglund, et al., 2004). Overall, rates of mental health problems in the 2018 HRBS were significantly lower among the reserve component compared with active component service members. Past studies have reported considerable variation in estimates of psychiatric

[3] Active-duty military members are eligible to use VA providers under certain circumstances (e.g., VA-DoD sharing agreements, during the transition out of active duty, in emergency situations, etc.), though this is rare, which may account for the large RR and ARR associated with this outcome.

disorders, such as depression and PTSD, across studies of reserve component service members, which may be attributable to a range of factors, including methodological differences across individual studies, as well as differences in sample composition and such risk factors as combat deployment history (Cohen, Fink, et al., 2015). While the comparison with other populations should be made with caution, because of differences in the samples and the methods used, it is important to recognize that many reserve component service members are affected by these problems. There were some differences in rates of mental health problems by service member characteristics. For example, mental health problems varied significantly across branches, with trends toward higher rates in the Army National Guard and Marine Corps Reserve and lower rates among the Air Force Reserve, Air National Guard, and Coast Guard Reserve.

With respect to social and emotional factors associated with mental health, angry or aggressive behaviors were reported by nearly half of reserve component service members, with the highest rates observed among the Army National Guard and the lowest rates observed among the Air Force Reserve. Rates of angry or aggressive behaviors among the reserve component were slightly but significantly lower (e.g., 5 percent lower for any angry or aggressive behaviors) than those observed in the active component. Experiences of physical assault since joining the military and in the past year were relatively uncommon (3.8 percent and 0.7 percent, respectively); rates among the reserve component were significantly lower than those experienced by active component service members. The 2018 HRBS asked specifically about unwanted sexual contact that had occurred since joining the military and found that 7.8 percent of service members indicated experiencing any unwanted sexual contact since joining the military and 1.6 percent indicated having such experiences within the past 12 months. Experiencing unwanted sexual contact was much more common among women than men: Nearly a quarter of women (24.0 percent) in the reserve component indicated having such experiences since joining the military, and nearly 5 percent of women indicated that they had experienced unwanted sexual contact in the past 12 months. It is important to note that the question asks about events that occurred at any time and at any place since joining the military, so they might not necessarily have occurred on a military site or during official military activities and the perpetrator might not have been a military service member. It is also important to remember that the measure of unwanted sexual contact used in the 2018 HRBS is not directly comparable with any other civilian or military survey, including the WGRA and the WGRR.

Suicidal ideation and suicide behaviors were more prevalent among reserve component service members than among the general population. Approximately 6 percent of reserve component service members endorsed having thoughts of suicide, and 0.9 percent endorsed a suicide attempt in the past 12 months; by comparison, among adults aged 18 or older in the general population, 4.3 percent endorsed thoughts of suicide, and 0.6 percent reported a suicide attempt in the past year (Substance Abuse and Mental Health Services Administration, 2019b). Overall, rates of suicide ideation were approximately 28 percent lower among reserve component service members compared with the active component; the rate of past-year suicide attempts was marginally significantly smaller among the reserve component, by roughly 37 percent. Within the reserve component, there were significant differences in rates of suicide ideation across service branches, with the highest rates observed in the Marine Corps Reserve and Army National Guard and the lowest rates observed among the Air Force Reserve, Air National Guard, and Coast Guard Reserve. Moreover, rates tended to be higher among junior enlisted (E1–E4) reserve component service members compared with service members in higher pay grades. Because suicide ideation can be a precursor to suicide attempts and is

tightly linked to mental health conditions, such as major depressive disorder (Bryan, Bryan, et al., 2014; Franklin et al., 2017; Jobes and Joiner, 2019), the prevalence of suicide ideation among reserve component service members is concerning. This could indicate a need for additional targeted suicide prevention efforts among reserve component service members, particularly among more-junior service members and branches with a higher prevalence of reported suicide ideation.

The use of mental health services was fairly common, with about one-fifth (21 percent) of reserve component service members reporting treatment in the past year. This is similar to the prevalence of mental health service use in the general population. However, in making this comparison, it is important to recognize that the reserve component population is mostly male and mostly below 40 years of age, two factors associated with significantly lower use of mental health services. For instance, a recent general population study found the prevalence of mental health service use to be 17 percent among men (of all ages) and 16 percent among those age 18–39 (of all genders). Taking these factors into account, use of mental health services by reserve component services members is high.

Mental health specialists were the most commonly accessed type of providers for mental health services, although general medical doctors, pastoral counselors (including clergy members and chaplains), and other providers also appear to contribute substantially to mental health services for service members. Perceived unmet need for mental health treatment was low (4.6 percent of all service members). However, among those with likely treatment need (i.e., those who self-identified as needing services but not getting them and those who endorsed serious psychological distress but did not utilize mental health treatment), the most common reason for not seeking care was not thinking that it was needed, which is consistent with findings from the civilian literature (Mojtabai, Olfson, and Mechanic, 2002). Additionally, many of the most commonly endorsed reasons for not receiving mental health care are related to potential adverse professional and interpersonal consequences of seeking care. This is consistent with the finding that nearly a third of the reserve component sample (29.9 percent) endorsed the idea that seeking mental health treatment would damage a person's military career.

Despite the high level of mental health service use, there are still significant barriers to treatment reported by reserve component service members with perceived unmet needs and people with high levels of distress who did not receive treatment. Issues facing the military in increasing the use of mental health treatment by service members who need it are similar to those faced in the civilian world. In both the general population and the military, individuals with mental health problems frequently do not consider themselves in need of treatment or do not believe that treatment will be a benefit to them (Mojtabai et al., 2011; Hoge, Castro, et al., 2004; Acosta et al., 2014). Similarly, reserve component service members also commonly endorsed practical problems with the process of seeking care, including difficulty in scheduling an appointment and challenges with taking time off from work duties to seek care, which is consistent with previous research (Kim, Thomas, et al., 2010). Such practical challenges may increase the difficulty of using formal mental health services for some service members. In addition, the military faces additional challenges with the widespread perception that seeking care for mental health problems will disrupt one's relationships with one's peers and commanders and damage one's potential for career advancement within the military.

CHAPTER SEVEN

Physical Health and Functional Limitations

This chapter presents analyses of chronic physical health conditions and physical symptoms, self-rated health, and health-related functional limitations among service members in the reserve component. Military service, including training, deployment, and duty-related exposures, and health-related military policies and practices are among the many factors that can affect the prevalence of chronic conditions among military service members. These factors might sometimes reduce the prevalence of chronic conditions (e.g., those entering the military service are selected in part based on the adequacy of their health status; administrative or medical reasons can lead to early attrition; norms and requirements regarding physical activity may reduce rates of obesity and some chronic illness) and sometimes increase health risks (e.g., high-impact activities and carrying heavy loads can cause lower-extremity or other joint problems; Cohen, Gallagher, et al., 2012). In turn, health conditions can result in reduced productivity and missed days of work, affecting individual, unit, and population readiness and rendering some individuals or units nondeployable or marginally functional in potentially demanding situations, missions, or environments. Within the physical health and functional limitations domain, we examined the relationship of health-related absenteeism (duty days missed due to health) and presenteeism (duty days impaired due to health) with chronic physical conditions (reported by a service member to have been diagnosed by a medical provider), physical symptoms (somatic symptoms and pain), and self-rated health.

Each section reviews the relevance of the topic to the military and provides estimates by service branch. We also present results by pay grade and gender. Results by race/ethnicity and age group are presented in Appendix D. Key measures used are described in the applicable section, and additional details about the measures can be found in Appendix C. All analyses demonstrated statistically significant omnibus tests (a Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless otherwise noted in the tables. Statistically significant group differences (pairwise comparisons) are presented within each table. However, only statistically significant differences that the research team's subject-matter experts determined to be substantively meaningful (i.e., those that could be used to change or develop policy or that contribute to inequalities in health outcomes across subgroups) are discussed in the text.

Where appropriate, the text compares service members with civilian benchmarks (i.e., HP2020 goals) and/or current prevalence rates among U.S. adults; however, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest. Readers should also use caution when interpreting comparisons between the 2018 HRBS results and other populations

or prior versions of the HRBS because these comparisons are not necessarily statistically significant and could simply reflect sampling variability across the two samples being compared.

At the end of the chapter, we present comparisons between the active and reserve components on the key outcomes presented. These comparative results use ARRs based on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARRs can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20-percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matter for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind what the base is for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Chronic Conditions

The burden of chronic disease in the United States is substantial. Chronic diseases are the leading cause of death in the United States (National Center for Chronic Disease Prevention and Health Promotion, 2019). The presence of chronic conditions is associated with functional, physical, social, and cognitive limitations (Buttorff, Ruder, and Bauman, 2017) and reduced quality of life (Megari, 2013). Chronic diseases account for the majority of health care costs in the United States (Gerteis et al., 2014), and the seven most common chronic diseases are estimated to result in $1.3 trillion in costs, which represents 78 percent of health spending (Bodenheimer, Chen, and Bennett, 2009). One 2018 HRBS item asked whether respondents had been told by a doctor or health professional during the past 12 months that they were diagnosed with high blood pressure; high blood sugar or diabetes; high cholesterol; asthma; angina or coronary heart disease; heart attack, also called myocardial infarction; back pain; or bone, joint, or muscle injury or condition. In addition, we developed a measure to indicate the number of medical diagnoses service members had received in the past year, categorized as no conditions, 1–2 conditions, or 3+ conditions. Results for past-12-month diagnosis of chronic conditions by subgroup (i.e., service branch, pay grade, and gender) are shown in Tables 7.1 through 7.3. Key findings include the following:

- Overall, 36.6 percent of reserve component service members reported being told by a health care provider that they had at least one of the eight chronic conditions (Table 7.1). The prevalence ranged from 32.0 percent in the Air National Guard to 40.1 percent in the Army Reserve (Table 7.1). This prevalence suggests the presence of a potentially large group of medically vulnerable service members in the reserve component.

Table 7.1
Past-Year Physician-Diagnosed Chronic Conditions, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
High blood pressure	7.3%[f] (6.1–8.6)	7.8% (6.8–8.9)	9.9% (8.6–11.1)	9.8% (8.8–10.9)	6.7% (3.7–9.7)	10.7%[a] (8.8–12.5)	7.2% (4.1–10.3)	9.1% (8.3–10.0)	9.4% (8.5–10.2)	9.3% (8.7–9.9)
Diabetes	1.0% (0.6–1.4)	1.0% (0.6–1.3)	1.6%[e] (1.1–2.2)	1.1% (0.8–1.5)	0.2%[c] (0.0–0.4)	1.3% (0.8–1.8)	0.8% (0.0–1.6)	1.3% (1.0–1.6)	1.1% (0.8–1.4)	1.2% (1.0–1.4)
High cholesterol	6.3%[g] (5.2–7.4)	6.6% (5.7–7.5)	7.8%[e] (6.8–8.8)	6.4%[g] (5.6–7.1)	3.5%[c,f,g] (1.8–5.1)	8.4%[e] (6.9–10.0)	11.1%[a,d,e] (7.5–14.7)	7.2% (6.6–7.9)	6.4% (5.8–7.0)	6.8% (6.3–7.2)
Asthma	1.1%[c] (0.6–1.6)	1.1%[c] (0.6–1.5)	2.9%[a,b] (2.2–3.6)	2.0% (1.5–2.6)	0.9% (0.2–1.6)	2.1% (1.2–2.9)	0.3% (0.0–0.8)	2.2% (1.8–2.6)	1.8% (1.3–2.3)	2.0% (1.7–2.3)
Angina or coronary heart disease[z]	0.1% (0.02–0.3)	0.3% (0.1–0.4)	0.4% (0.2–0.6)	0.4% (0.1–0.6)	0.1% (0.0–0.2)	0.2% (0.1–0.3)	0.1% (0.0–0.4)	0.3% (0.2–0.4)	0.3% (0.1–0.5)	0.3% (0.2–0.4)
Heart attack[z]	0.02% (0.0–0.1)	0.3% (0.1–0.4)	0.2% (0.1–0.4)	0.2% (0.0008–0.4)	0.0% (0.0–1.2)	0.2% (0.0–0.5)	0.0% (0.0–1.6)	0.2% (0.1–0.3)	0.2% (0.1–0.3)	0.2% (0.1–0.3)
Back pain	17.6%[c,d] (15.6–19.6)	17.8%[c,d] (16.2–19.4)	24.4%[a,b] (22.5–26.4)	22.2%[a,b] (20.6–23.8)	23.9% (18.9–28.8)	19.6% (16.9–22.2)	18.2% (13.3–23.1)	22.2% (20.9–23.5)	21.2% (19.9–22.4)	21.6% (20.7–22.5)
Bone, joint, or muscle injury (including arthritis)	19.4%[c] (17.3–21.4)	16.9%[c,d] (15.5–18.4)	24.6%[a,b] (22.8–26.4)	22.8%[b] (21.2–24.5)	21.1% (16.5–25.7)	20.4% (17.7–23.1)	17.6% (12.7–22.6)	22.4% (21.2–23.6)	21.4% (20.2–22.7)	21.9% (21.0–22.8)
Number of medical diagnoses in past year										
No conditions	67.3%[c] (64.8–69.8)	68.0%[c,d] (66.1–69.9)	59.8%[a,b] (57.6–62.1)	62.8%[b] (60.8–64.7)	67.6% (62.1–73.0)	63.4% (60.0–66.7)	65.7% (59.3–72.0)	62.7% (61.2–64.2)	64.0% (62.5–65.6)	63.4% (62.3–64.5)
1–2 conditions	29.3% (26.9–31.7)	27.9%[c] (26.1–29.8)	32.9%[b] (30.8–35.1)	31.2% (29.3–33.0)	27.6% (22.4–32.7)	30.8% (27.7–34.0)	29.2% (23.2–35.3)	31.3% (29.9–32.7)	30.4% (28.9–31.9)	30.8% (29.8–31.8)
3+ conditions	3.4%[c,d,f] (2.6–4.1)	4.1%[c,d] (3.4–4.8)	7.2%[a,b] (6.3–8.2)	6.1%[a,b] (5.3–6.8)	4.9% (2.4–7.3)	5.8%[a] (4.5–7.1)	5.1% (2.7–7.5)	6.0% (5.4–6.6)	5.6% (5.0–6.2)	5.8% (5.3–6.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 7.2
Past-Year Physician-Diagnosed Chronic Conditions, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
High blood pressure	4.6%[b,c,d,e,f] (3.6–5.6)	11.0%[a,c,f] (9.9–12.2)	19.0%[a,b,e,f] (17.6–20.5)	15.0%[a,e] (11.2–18.9)	8.2%[a,c,d,f] (6.6–9.8)	13.9%[a,b,c,e] (12.5–15.3)
Diabetes	0.6%[c,d,f] (0.2–0.9)	1.2%[c,f] (0.8–1.6)	3.1%[a,b,e] (2.5–3.8)	2.2%[a] (1.0–3.5)	0.5%[c,f] (0.04–1.0)	2.3%[a,b,e] (1.7–3.0)
High cholesterol	2.3%[b,c,d,e,f] (1.6–2.9)	7.0%[a,c,d,f] (6.2–7.9)	16.5%[a,b,e] (15.2–17.9)	17.7%[a,b,e] (13.6–21.7)	5.8%[a,c,d,f] (4.4–7.3)	15.9%[a,b,e] (14.5–17.4)
Asthma	1.5%[c] (0.9–2.1)	2.0% (1.6–2.5)	3.0%[a] (2.4–3.6)	1.5% (0.4–2.6)	2.2% (1.0–3.4)	2.8% (2.0–3.5)
Angina or coronary heart disease	0.2% (0.0–0.4)	0.3%[c] (0.1–0.4)	0.8%[b] (0.5–1.1)	0.2% (0.0–0.6)	0.2% (0.02–0.4)	0.6% (0.3–0.8)
Heart attack	0.2% (0.0–0.4)	0.1%[c] (0.05–0.2)	0.5%[b] (0.3–0.8)	0.0% (0.0–1.1)	0.05% (0.0–0.1)	0.2% (0.01–0.3)
Back pain	14.5%[b,c,d,e,f] (12.9–16.1)	25.4%[a,c,e] (23.9–27.0)	36.4%[a,b,e,f] (34.6–38.2)	33.2%[a,e,f] (27.8–38.6)	19.8%[a,b,c,d] (17.1–22.4)	24.2%[a,c,d] (22.4–26.0)
Bone, joint, or muscle injury (including arthritis)	12.9%[b,c,d,e,f] (11.4–14.4)	26.2%[a,c,d,e] (24.6–27.8)	40.4%[a,b,e,f] (38.6–42.2)	35.3%[a,b,e] (29.9–40.7)	17.9%[a,b,c,d,f] (15.2–20.5)	29.1%[a,c,e] (27.2–31.0)
Number of medical diagnoses in past year						
No conditions	76.2%[b,c,d,e,f] (74.3–78.1)	58.2%[a,c,d,e,f] (56.5–60.0)	40.3%[a,b,e,f] (38.4–42.1)	42.7%[a,b,e] (36.8–48.6)	64.5%[a,b,c,d,f] (61.3–67.7)	49.7%[a,b,c,e] (47.6–51.8)
1–2 conditions	21.5%[b,c,d,e,f] (19.7–23.4)	35.0%[a,c,d,f] (33.3–36.7)	44.5%[a,b,e] (42.6–46.4)	46.5%[a,b,e] (40.6–52.4)	32.1%[a,c,d,f] (28.9–35.3)	41.2%[a,b,e] (39.1–43.2)
3+ conditions	2.3%[b,c,d,f] (1.6–2.9)	6.7%[a,c,d,e,f] (5.9–7.6)	15.2%[a,b,e,f] (13.9–16.5)	10.8%[a,b,e] (8.0–13.6)	3.4%[b,c,d,f] (2.5–4.3)	9.1%[a,b,c,e] (7.9–10.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

- Regarding pay grade, the proportion of service members diagnosed with chronic conditions increased with rank among enlisted service members and among officers. Junior enlisted service members had the lowest rate of chronic conditions, with 76.2 percent (95-percent CI: 74.3, 78.1) reporting none of the eight chronic conditions (Table 7.2). In part, this may reflect the increasing prevalence of conditions with age (Appendix Table D.68).
- Regarding gender, men had significantly higher rates of high blood pressure, diabetes, high cholesterol, and angina or coronary heart disease than women, but women had higher rates of asthma (Table 7.3).

Table 7.3
Past-Year Physician-Diagnosed Chronic Conditions, by Gender

	Men	Women
High blood pressure	10.4%[a] (9.6–11.1)	5.0% (4.4–5.6)
Diabetes	1.3%[a] (1.1–1.6)	0.7% (0.5–1.0)
High cholesterol	7.6%[a] (7.0–8.1)	3.8% (3.3–4.2)
Asthma	1.7%[a] (1.3–2.0)	3.2% (2.5–3.9)
Angina or coronary heart disease	0.4%[a] (0.2–0.5)	0.1% (0.04–0.3)
Heart attack[z]	0.2% (0.1–0.3)	0.1% (0.0–0.2)
Back pain[z]	21.9% (20.8–23.0)	20.5% (19.1–21.9)
Bone, joint, or muscle injury (including arthritis)[z]	21.6% (20.5–22.6)	23.1% (21.6–24.6)
Number of medical diagnoses in past year		
No conditions[z]	63.1% (61.8–64.4)	64.7% (62.9–66.5)
1–2 conditions[z]	30.7% (29.5–31.9)	31.2% (29.5–32.9)
3+ conditions	6.2% [a] (5.7–6.7)	4.1% (3.6–4.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- The most commonly reported provider-diagnosed conditions were bone, joint, or muscle injury (including arthritis) (21.9 percent; 95-percent CI: 21.0, 22.8) and back pain (21.6 percent; 95-percent CI: 20.7, 22.5; Table 7.1). HP2020 has several objectives related to arthritis and chronic back conditions, including the reduction of functional limitations, as well as reducing arthritis-related joint pain and chronic pain. Based on NHIS data, approximately 22.8 percent of U.S. adults have been diagnosed with arthritis (CDC, 2018d). Although these estimates are not directly comparable with the 2018 HRBS, this prevalence is similar to what was observed in the reserve component (Table 7.3).
- HP2020 aims to increase overall cardiovascular health and reduce coronary heart disease–related deaths. Relatedly, it has established objectives related to high blood pressure and high cholesterol. For high blood pressure, HP2020 has established a target of 26.9 percent or less of the U.S. adult population to have high blood pressure (Healthy People, 2020c).

Among reserve component service members in the 2018 HRBS, 9.3 percent (95-percent CI: 8.7, 9.9) were diagnosed with high blood pressure (Table 7.1), suggesting that they fare well with respect to the HP2020 goal. In addition, NHANES data from 2015–2016 indicated that an estimated 32.1 percent of U.S. adults had hypertension (Wall et al., 2018), though demographic differences between the military and general population limit direct comparisons with these benchmarks.

- Relatedly, regarding cholesterol, HP2020 established a target of 13.5 percent or less of U.S. adults with high total blood cholesterol levels (Healthy People, 2020d). According to NHANES, 27.1 percent of the population of U.S. adults age 20 and over have high cholesterol (National Center for Health Statistics, 2017). Among service members, 6.8 percent (95-percent CI: 6.3, 7.2) were diagnosed with high cholesterol in the last year.
- HP2020 has also established objectives related to diabetes, including reducing the annual number of new cases of diagnosed diabetes and diabetes-related deaths. According to data from NHIS, an estimated 9.7 percent of U.S. adults age 20 and over have been diagnosed with diabetes (Mendola et al., 2018). Though not directly comparable to our data, results from the 2018 HRBS suggest that rates are much lower in reserve component service members (1.2 percent; 95-percent CI: 1.0, 1.4).
- An estimated 2.0 percent (95-percent CI: 1.7, 2.3) of service members were diagnosed with asthma in the past year. HP2020 has several objectives related to asthma, including reducing asthma hospitalizations, deaths, functional limitations, and missed school or work. In 2011–2014, 8.8 percent of U.S. adults age 20 and over were diagnosed with asthma (Akinbami and Fryar, 2016). Though this is not directly comparable to our data, in part due to the age range in this sample, it suggests lower rates of asthma among reserve component service members.

Physical Symptoms

An estimated 34 percent of civilians reported at least one frequent general physical symptom (Escobar et al., 2010), and one-third of somatic symptoms did not have a disease-based explanation and were considered to be medically unexplained (Escobar et al., 2010; Kroenke, 2003). The presence of multiple physical symptoms is associated with greater rates of depression, anxiety, substance use disorders, and medical service use (Escobar et al., 2010; Kroenke, 2003; Löwe et al., 2008).

HRBS respondents completed items addressing eight common physical symptoms (stomach or bowel problems; back pain; pain in the arms, legs, or joints; headaches; chest pain or shortness of breath; dizziness; feeling tired or having low energy; trouble sleeping) taken from the widely used and well-validated Patient Health Questionnaire-15 (PHQ-15; Kroenke et al., 2002). Respondents were asked to indicate how much they were bothered by each of these symptoms in the past 30 days. These same symptom items have been used on the Somatic Symptom Scale (Gierk et al., 2014).

Consistent with the PHQ-15, response options included "not bothered at all," "bothered a little bit," and "bothered a lot," and an average item score of 1 ("bothered a little bit") or more was considered a high level of physical symptoms (Kroenke et al., 2002). We report on the percentage of service members with high levels of symptoms overall. We also report on the percentage of service members bothered a lot by individual symptoms to maximize their clini-

cal relevance. The first measure includes any service members who reported being bothered a lot by either back pain or pain in the arms, legs, or joints. The second measure also includes service members who reported being bothered a lot by headaches. Finally, we developed a summary score by assigning each symptom a score of 0 (not bothered at all), 1 (bothered a little bit), or 2 (bothered a lot), summing the values across all eight measures, and creating a measure of *high physical symptom severity* (defined as a score of 8 or higher). Note, however, that there is no existing literature that validates this scoring against the probability of a clinical diagnosis; "high" in this sense reflects that that the scoring pattern is relatively infrequent in the population.

Results can be found in Tables 7.4 through 7.6. Key findings include the following:

- The most commonly reported symptom was trouble sleeping (13.7 percent; 95-percent CI: 12.9, 14.5), and feeling tired or having low energy was also common (11.9 percent; 95-percent CI: 11.2, 12.7; Table 7.4). Both were more common among women than men (Table 7.6).
- Back pain (13.0 percent; 95-percent CI: 12.2, 13.7) and pain in the arms, legs, or joints (11.7 percent; 95-percent CI: 11.0, 12.4) were also among the most common symptoms (Table 7.4). In fact, 18.6 percent (95-percent CI: 17.7, 19.4) reported bodily pain not including headache, and 21.1 percent (95-percent CI: 20.2, 22.0) reported bodily pain including headache. In part, this may be attributable to age. However, there was a disparity in rates of pain for enlisted personnel versus officers. For example, focusing on any bodily pain including headache, there was no significant difference in prevalence for junior enlisted personnel (16.4 percent; 95-percent CI: 14.8, 18.1) compared to junior officers (15.4 percent; 95-percent CI: 13.2, 17.7). However, the prevalence of pain was significantly higher for senior enlisted personnel (33.1 percent; 95-percent CI: 31.4, 34.9) than senior officers (20.6 percent; 95-percent CI: 18.9, 22.3).
- Significantly more women were bothered a lot by stomach or bowel problems; pain in the arms, legs, or joints; headaches; feeling tired or having low energy; and trouble sleeping (Table 7.6). A higher proportion of women also had high physical symptom severity scores (14.8 percent; 95-percent CI: 13.5, 16.1) than men (10.0 percent; 95-percent CI: 9.2, 10.8).

Table 7.4
Bothered a Lot by Physical Symptoms in the Past 30 Days, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Stomach or bowel problems	3.9%[c] (3.0–4.8)	3.8%[c] (3.0–4.6)	6.3%[a,b] (5.3–7.3)	5.0% (4.2–5.9)	7.4% (4.5–10.3)	5.6% (4.0–7.1)	3.2% (1.4–5.1)	5.8% (5.1–6.5)	4.7% (4.1–5.4)	5.2% (4.7–5.7)
Back pain	10.5%[c,e] (8.9–12.1)	9.1%[c,d,e] (8.0–10.2)	15.6%[a,b] (14.0–17.2)	12.8%[b] (11.6–14.0)	17.2%[a,b] (12.5–21.8)	12.5% (10.2–14.9)	11.2% (7.1–15.4)	14.2% (13.1–15.3)	11.9% (11.0–12.9)	13.0% (12.2–13.7)
Pain in the arms, legs, or joints	9.1%[c] (7.7–10.6)	7.9%[c,d,f] (6.9–9.0)	14.0%[a,b] (12.6–15.5)	12.0%[b] (10.8–13.3)	12.5% (8.4–16.5)	11.3%[b] (9.2–13.4)	8.1% (5.1–11.1)	12.4% (11.4–13.4)	11.1% (10.1–12.0)	11.7% (11.0–12.4)
Headaches	4.2%[c,d] (3.3–5.1)	4.4%[c,d] (3.6–5.2)	7.3%[a,b] (6.3–8.4)	7.6%[a,b] (6.5–8.7)	3.9% (2.1–5.7)	6.2% (4.6–7.7)	4.8% (2.4–7.2)	6.2% (5.5–6.8)	6.9% (6.0–7.7)	6.5% (6.0–7.1)
Chest pain or shortness of breath[z]	1.4% (0.9–2.0)	1.8% (1.2–2.3)	2.0% (1.4–2.6)	2.2% (1.6–2.8)	1.4% (0.3–2.6)	2.0% (0.8–3.2)	1.7% (0.4–3.0)	1.8% (1.4–2.2)	2.1% (1.7–2.6)	2.0% (1.7–2.3)
Dizziness[z]	1.4% (0.9–2.0)	1.7% (1.2–2.3)	2.2% (1.6–2.7)	2.1% (1.5–2.7)	1.7% (0.4–3.0)	2.4% (1.2–3.6)	1.4% (0.3–2.6)	2.0% (1.6–2.4)	2.0% (1.5–2.5)	2.0% (1.7–2.3)
Feeling tired or having low energy	7.9%[c,d,e,f] (6.6–9.2)	8.9%[c,d,f] (7.7–10.1)	12.1%[a,b] (10.6–13.5)	13.1%[a,b] (11.7–14.4)	13.2%[a] (9.4–17.1)	14.7%[a,b] (12.2–17.2)	10.2% (6.3–14.1)	11.8% (10.8–12.8)	12.1% (11.0–13.2)	11.9% (11.2–12.7)
Trouble sleeping	9.0%[c,d,e,f] (7.5–10.4)	9.0%[c,d,e,f] (7.8–10.2)	14.3%[a,b] (12.8–15.8)	15.4%[a,b] (13.8–16.9)	16.3%[a,b] (12.1–20.5)	14.4%[a,b] (11.9–16.8)	11.9% (7.6–16.1)	13.4% (12.4–14.5)	13.9% (12.7–15.1)	13.7% (12.9–14.5)
Any bodily pain (back, arms, legs, or joints)	15.4%[c] (13.5–17.3)	13.3%[c,d,e,f] (12.0–14.6)	21.8%[a,b] (19.9–23.6)	18.8%[b] (17.3–20.2)	22.4%[b] (17.3–27.4)	18.1%[b] (15.4–20.7)	14.5% (10.0–19.0)	19.9% (18.7–21.1)	17.5% (16.3–18.6)	18.6% (17.7–19.4)
Any bodily pain including headache	17.0%[c,d] (15.1–19.0)	15.3%[c,d,e,f] (13.8–16.7)	24.0%[a,b] (22.1–25.9)	22.0%[a,b] (20.3–23.6)	23.1%[b] (18.1–28.2)	21.0%[b] (18.2–23.8)	17.6% (12.8–22.5)	22.0% (20.7–23.3)	20.4% (19.1–21.6)	21.1% (20.2–22.0)
High physical symptom severity	6.6%[c,d,e,f] (5.4–7.8)	7.3%[c,d,e,f] (6.2–8.3)	12.6%[a,b] (11.2–14.0)	11.9%[a,b] (10.6–13.2)	13.2%[a,b] (9.5–16.9)	11.1%[a,b] (9.0–13.2)	8.1% (4.6–11.5)	11.2% (10.3–12.1)	10.8% (9.8–11.8)	11.0% (10.3–11.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 7.5
Bothered a Lot by Physical Symptoms in the Past 30 Days, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Stomach or bowel problems	4.1%[b,c] (3.3–4.9)	6.0%[a] (5.1–6.9)	7.3%[a,f] (6.3–8.3)	5.4% (3.2–7.6)	5.2% (3.6–6.8)	5.0%[c] (4.0–5.9)
Back pain	9.4%[b,c,d,f] (8.2–10.7)	15.5%[a,c,e,f] (14.2–16.9)	21.3%[a,b,e,f] (19.7–22.8)	20.1%[a,e,f] (15.5–24.6)	9.6%[b,c,d] (7.7–11.6)	12.2%[a,b,c,d] (10.8–13.6)
Pain in the arms, legs, or joints	8.3%[b,c,d,f] (7.1–9.5)	13.8%[a,c,e] (12.5–15.0)	21.7%[a,b,e,f] (20.2–23.3)	16.4%[a,e] (12.4–20.3)	6.9%[b,c,d,f] (5.6–8.2)	11.2%[a,c,e] (9.9–12.5)
Headaches	5.8%[c] (4.8–6.9)	7.9%[e,f] (6.9–8.9)	8.6%[a,e,f] (7.5–9.6)	6.7% (4.3–9.1)	4.2%[b,c] (3.2–5.2)	4.3%[b,c] (3.5–5.1)
Chest pain or shortness of breath[z]	1.8% (1.2–2.4)	2.3% (1.7–2.8)	2.6% (1.9–3.2)	1.4% (0.3–2.4)	1.8% (1.1–2.5)	1.6% (1.1–2.2)
Dizziness[z]	1.9% (1.3–2.5)	2.3% (1.7–2.8)	2.4% (1.8–2.9)	1.3% (0.3–2.3)	1.5% (0.9–2.2)	1.4% (0.9–1.9)
Feeling tired or having low energy	10.9%[c] (9.5–12.4)	13.5%[e,f] (12.3–14.8)	15.4%[a,e,f] (14.0–16.8)	10.5% (7.2–13.9)	9.4%[b,c] (7.6–11.1)	9.0%[b,c] (7.9–10.2)
Trouble sleeping	12.5%[c,e] (10.9–14.0)	15.5%[c,e,f] (14.2–16.8)	18.5%[a,b,e,f] (17.0–19.9)	16.6%[e,f] (12.7–20.6)	8.1%[a,b,c,d] (6.6–9.6)	10.9%[b,c,d] (9.6–12.1)
Any bodily pain (back, arms, legs, or joints)	13.8%[b,c,d,f] (12.2–15.3)	21.6%[a,c,e] (20.1–23.0)	31.0%[a,b,e,f] (29.3–32.8)	28.0%[a,e,f] (22.9–33.2)	13.1%[b,c,d,f] (11.0–15.3)	18.8%[a,c,d,e] (17.2–20.4)
Any bodily pain including headache	16.4%[b,c,d,f] (14.8–18.1)	24.3%[a,c,e,f] (22.7–25.8)	33.1%[a,b,e,f] (31.4–34.9)	30.5%[a,e,f] (25.3–35.8)	15.4%[b,c,d,f] (13.2–17.7)	20.6%[a,b,c,d,e] (18.9–22.3)
High physical symptom severity	9.2%[b,c,d,e] (7.9–10.5)	13.1%[a,c,e,f] (11.9–14.4)	16.7%[a,b,e,f] (15.3–18.1)	14.7%[a,e,f] (11.0–18.3)	5.9%[a,b,c,d] (4.7–7.1)	8.3%[b,c,d] (7.2–9.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 7.6
Bothered a Lot by Physical Symptoms in the Past 30 Days, by Gender

	Men	Women
Stomach or bowel problems	4.6%[a] (4.1–5.2)	7.4% (6.4–8.4)
Back pain[z]	12.7% (11.9–13.6)	13.9% (12.7–15.1)
Pain in the arms, legs, or joints	11.3%[a] (10.5–12.1)	13.0% (11.8–14.2)
Headaches	5.3%[a] (4.7–6.0)	11.2% (10.0–12.5)
Chest pain or shortness of breath[z]	1.9% (1.6–2.3)	2.2% (1.6–2.8)
Dizziness[z]	1.9% (1.5–2.3)	2.3% (1.8–2.8)
Feeling tired or having low energy	10.7%[a] (9.9–11.6)	16.7% (15.4–18.1)
Trouble sleeping	13.0%[a] (12.0–13.9)	16.4% (14.9–17.9)
Any bodily pain (back, arms, legs, or joints)	18.0%[a] (17.0–19.0)	20.8% (19.3–22.3)
Any bodily pain including headache	19.8%[a] (18.7–20.9)	26.1% (24.5–27.8)
High physical symptom severity	10.0%[a] (9.2–10.8)	14.8% (13.5–16.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Traumatic Brain Injury and Postconcussive Symptoms

Military service members are at risk for experiencing a range of physical injuries. Some causes of injury are related to the military experience or can be more common among service members, such as physical training exercises, parachuting, falls, and jumps (Canham-Chervak et al., 2010; Jones et al., 2000; Kaufman, Brodine, and Shaffer, 2000). Other causes of injury include vehicle crashes (both privately owned and military vehicles) and sports (Canham-Chervak et al., 2010; Jones et al., 2000). Deployment also increases the risk of certain types of injury; for example, this can include injuries from combat-related causes (e.g., explosives, gunshot wounds) and noncombat causes (e.g., machinery) (Belmont, Owens, and Schoenfeld, 2016; Le et al., 2018). Each of these events can place service members at increased risk for a TBI. From 2000 to 2018, a total of 383,947 service members experienced TBIs (Defense and Veterans Brain Injury Center, 2018). Approximately 82.3 percent of TBIs were mild, 9.7 percent were moderate, 5.6 percent were severe, and 1.4 percent were penetrating. Moreover, TBI is one of the most common injuries among veterans of Operation Enduring Freedom and Operation

Iraqi Freedom, affecting an estimated 12.2 percent of veterans (Tanielian and Jaycox, 2008). Mental health concerns are common among service members with a history of mild traumatic brain injury (mTBI), including depression and PTSD (Kennedy et al., 2019; McDonald et al., 2017), as is chronic pain (Nampiaparampil, 2008). Moderate and severe TBI can lead to lasting cognitive dysfunction (Rabinowitz and Levin, 2014). Understanding the current prevalence of mTBI, TBI, and postconcussive symptoms will allow the military to strengthen postdeployment screening processes and identify those at greater risk for experiencing persistent symptoms or long-term effects of the injury.

TBI was assessed using three sets of items based on the Brief Traumatic Brain Injury Screen, which was developed by an interdisciplinary VA task force and used by the Defense and Veterans Brain Injury Center for previously deployed military veterans (Schwab et al., 2006). The assessment has been used extensively in military and VA settings. HRBS respondents were first asked to indicate whether they had experienced injuries in the past 12 months from each of the following sources: being struck by a flying object or fragment, bullet, vehicular accident, hard fall, blast or explosion, or some other way. This item was designed to measure past-year exposure to injuries potentially related to TBI. Next, to assess whether TBI might have occurred and to estimate its severity, respondents were asked whether they had received a jolt or blow to their head as a result of those injuries that immediately resulted in any of the following symptoms: loss of consciousness, confusion, memory loss, concussion symptoms (e.g., headache, dizziness), or head injury. Last, respondents were asked to report whether they had experienced any common postconcussive symptoms in the past 30 days that they thought could be related to the injury, including headaches, dizziness, memory problems, balance problems, ringing in the ears, irritability, sleep problems, or sensitivity to light. Note that in the 2015 HRBS, questions about injury and TBI were asked only of previously deployed personnel; in the 2018 HRBS, these questions were asked of all personnel.

A positive screen for mTBI occurred when a respondent (1) reported one or more injuries during any deployment and (2) recalled having lost consciousness for up to 20 minutes; feeling dazed, confused, or "seeing stars;" experiencing postconcussive symptoms; or a lack of memory for the event. A positive screen for moderate to severe TBI occurred when a respondent reported loss of consciousness lasting longer than 20 minutes. Finally, a positive screen for postconcussive symptoms occurred if a service member screened positive for TBI and endorsed four or more postconcussive symptoms or indicated that they had experienced a concussion or symptoms of a concussion.

Tables 7.7 through 7.9 present overall rates of injury in the past 12 months, estimates of individuals with possible TBI, and postconcussive symptoms. Key findings include the following:

- In the 2018 HRBS, 21.2 percent (95-percent CI: 20.2–22.1) of reserve component service members experienced an injury (Table 7.7). Rates of injury were higher among members of the Army Reserve, Army National Guard, and Marine Corps Reserve than among members of the Air Force Reserve and Air National Guard. There were no significant differences in rates of injury by pay grade (Table 7.8) or gender (Table 7.9).
- A total of 4.3 percent (95-percent CI: 3.8–4.8) of service members screened positive for mTBI (Table 7.7). Significantly more enlisted service members, across pay grade, screened positive for mTBI compared with senior officers; there was no significant difference observed compared with warrant officers or junior officers (Table 7.8).

Table 7.7
Past-Year Injury, TBI, and Postconcussive Symptoms, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any injury	15.8%[c,d,e] (13.9–17.8)	17.7%[c,d,e] (16.1–19.3)	21.8%[a,b] (19.9–23.6)	22.8%[a,b] (21.0–24.5)	25.8%[a,b] (20.6–31.0)	20.0% (16.8–23.2)	19.7% (14.3–25.2)	20.8% (19.5–22.0)	21.5% (20.1–22.9)	21.2% (20.2–22.1)
Positive screen for mild TBI	2.6%[c] (1.8–3.5)	3.0%[c] (2.2–3.7)	5.2%[a,b] (4.2–6.3)	4.6% (3.7–5.5)	4.5% (2.3–6.8)	4.1% (2.7–5.5)	2.4% (0.0–4.9)	4.4% (3.8–5.1)	4.2% (3.5–4.9)	4.3% (3.8–4.8)
Positive screen for moderate to severe TBI	0.02%[e] (0.0–0.1)	0.05%[e] (0.0–0.1)	0.1%[e] (0.03–0.2)	0.1% (0.0–0.3)	1.3%[a,b,c,f] (0.0–2.7)	0.1%[e] (0.0–0.1)	0.0% (0.0–1.6)	0.2% (0.1–0.4)	0.1% (0.0–0.2)	0.2% (0.1–0.3)
Postconcussive symptoms	1.4%[c,e] (0.8–1.9)	1.5%[c,e] (0.9–2.0)	3.6%[a,b] (2.8–4.5)	2.8% (2.1–3.5)	4.5%[a,b] (2.1–6.8)	2.1% (1.2–3.0)	0.8% (0.0–1.7)	3.0% (2.5–3.5)	2.4% (1.9–3.0)	2.7% (2.3–3.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 7.8
Past-Year Injury, TBI, and Postconcussive Symptoms, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any injury[z]	21.0% (19.2–22.9)	21.6% (20.1–23.1)	23.0% (21.4–24.6)	24.0% (18.9–29.0)	17.8% (15.6–20.1)	20.3% (18.7–22.0)
Positive screen for mild TBI	4.5%[f] (3.5–5.5)	4.8%[f] (4.0–5.6)	4.3%[f] (3.5–5.1)	3.6% (1.8–5.3)	3.3% (2.2–4.4)	2.5%[a,b,c] (1.9–3.1)
Positive screen for moderate to severe TBI[z]	0.2% (0.03–0.4)	0.2% (0.0–0.4)	0.1% (0.0–0.2)	0.0% (0.0–1.1)	0.0% (0.0–0.3)	0.1% (0.0–0.3)
Postconcussive symptoms	2.6% (1.8–3.3)	3.3%[e,f] (2.6–4.0)	3.1%[e,f] (2.4–3.8)	2.0% (0.9–3.2)	1.5%[b,c] (0.8–2.1)	1.7%[b,c] (1.2–2.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 7.9
Past-Year Injury, TBI, and Postconcussive Symptoms, by Gender

	Men	Women
Any injury[z]	21.0% (19.9–22.1)	22.0% (20.2–23.7)
Positive screen for mild TBI[z]	4.2% (3.6–4.8)	4.8% (4.0–5.5)
Positive screen for moderate to severe TBI[z]	0.2% (0.04–0.3)	0.2% (0.04–0.3)
Postconcussive symptoms[z]	2.6% (2.1–3.1)	3.1% (2.5–3.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- Rates of moderate to severe TBI were low, with 0.2 percent (95-percent CI: 0.1–0.3) of service members screening positive (Table 7.7). There were no significant differences in rates of screening positive for moderate or severe TBI across pay grades (Table 7.8) or gender (Table 7.9).
- An estimated 2.7 percent (95-percent CI: 2.3–3.1) of service members reported postconcussive symptoms (Table 7.7). Similarly, there were higher rates of postconcussive symptoms among midcareer and senior enlisted service members compared with junior or senior officers (Table 7.8). However, there were no gender differences in the rates of postconcussive symptoms (Table 7.9).

Self-Rated Health

In addition to reporting on physical symptoms, service members were asked to self-report their overall physical health. Self-rated health was assessed with a widely used single-item assessment, asking, "Would you say your overall health is (excellent, very good, good, fair, poor)?" Single-item self-rated health items like this question have good concurrent validity with measures of physical and emotional health (DeSalvo, Bloser, et al., 2006) and have been shown to be predictive of all-cause mortality (DeSalvo, Fisher, et al., 2006). Results can be found in Tables 7.10 through 7.12. Key findings include the following:

- Most reserve component service members reported that their health was very good or excellent (combined 57.4 percent). In addition, 33.4 percent (95-percent CI: 32.3–34.5) reported that their health was good (Table 7.10).
- Junior enlisted personnel, junior officers, and senior officers had significantly higher rates of excellent health than midcareer and senior enlisted reserve component service members (Table 7.11).
- Men had higher rates of excellent health (17.6 percent; 95-percent CI: 16.5–18.7) than women (14.5 percent; 95-percent CI: 13.3–15.7; Table 7.12). However, there were no significant gender differences in rates of fair or poor health (Table 7.12).

Table 7.10
Self-Rated Overall Physical Health, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Excellent	21.1%[c,d] (18.8–23.5)	19.6%[d] (17.8–21.3)	16.4%[a] (14.5–18.3)	15.3%[a,b] (13.7–16.9)	21.9% (17.0–26.7)	16.0% (13.6–18.5)	17.8% (12.5–23.0)	17.8% (16.6–19.1)	16.3% (15.0–17.6)	17.0% (16.1–17.9)
Very good	43.0% (40.3–45.7)	44.4%[c,d] (42.3–46.6)	38.1%[b] (35.7–40.4)	39.6%[b] (37.6–41.7)	43.6% (37.4–49.7)	39.8% (36.3–43.3)	37.1% (30.6–43.6)	39.8% (38.2–41.4)	40.8% (39.1–42.4)	40.4% (39.2–41.5)
Good	30.1% (27.5–32.7)	30.1%[d] (28.2–32.1)	34.6%[e] (32.3–36.9)	35.0%[b,e] (33.0–37.1)	23.9%[c,d,f,g] (19.0–28.7)	35.3%[e] (31.3–39.2)	40.1%[e] (32.8–47.4)	32.8% (31.3–34.4)	33.9% (32.3–35.5)	33.4% (32.3–34.5)
Fair	5.1%[c,d,e] (3.9–6.3)	5.3%[c,d,e] (4.4–6.2)	9.5%[a,b] (8.0–11.0)	8.7%[a,b] (7.5–9.9)	10.5%[a,b] (6.7–14.2)	8.0% (6.1–9.8)	3.9% (1.6–6.3)	8.4% (7.5–9.4)	7.9% (6.9–8.8)	8.1% (7.4–8.8)
Poor[x]	0.7% (0.2–1.1)	0.6% (0.2–0.9)	1.5% (0.9–2.0)	1.4% (0.9–1.8)	0.3% (0.0–0.6)	0.9% (0.3–1.6)	1.1% (0.0–3.3)	1.1% (0.8–1.4)	1.2% (0.8–1.5)	1.1% (0.9–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Table 7.11
Self-Rated Overall Physical Health, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Excellent	19.8%[b,c] (17.9–21.6)	14.0%[a,c,e,f] (12.7–15.3)	9.1%[a,b,e,f] (8.0–10.2)	13.5%[f] (9.4–17.5)	20.2%[b,c] (17.6–22.7)	22.6%[b,c,d] (20.8–24.4)
Very good	38.0%[e,f] (35.8–40.3)	39.7%[e,f] (37.9–41.5)	41.2%[e,f] (39.4–43.1)	43.4% (37.5–49.2)	47.7%[a,b,c] (44.5–51.0)	46.6%[a,b,c] (44.5–48.7)
Good	32.5%[c,f] (30.3–34.7)	35.4%[c,e,f] (33.7–37.1)	39.2%[a,b,e,f] (37.4–41.0)	35.1%[f] (29.6–40.6)	28.5%[b,c] (25.3–31.8)	26.1%[a,b,c,d] (24.3–28.0)
Fair	8.7%[e,f] (7.3–10.0)	9.2%[e,f] (8.1–10.3)	9.3%[e,f] (8.2–10.3)	6.7% (3.6–9.8)	3.1%[a,b,c] (2.0–4.1)	4.3%[a,b,c] (3.4–5.1)
Poor	1.0% (0.6–1.4)	1.6%[f] (1.1–2.1)	1.2%[f] (0.8–1.7)	1.3% (0.04–2.6)	0.5% (0.1–1.0)	0.4%[b,c] (0.1–0.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 7.12
Self-Rated Overall Physical Health, by Gender

	Men	Women
Excellent	17.6%[a] (16.5–18.7)	14.5% (13.3–15.7)
Very good[z]	40.6% (39.2–42.0)	39.4% (37.6–41.2)
Good	32.8%[a] (31.5–34.1)	35.7% (33.8–37.6)
Fair[z]	7.9% (7.1–8.6)	9.1% (7.8–10.4)
Poor[z]	1.1% (0.8–1.4)	1.3% (0.9–1.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Health-Related Functional Limitations

In addition to their impact on health care utilization and quality of life, chronic conditions and physical limitations can affect individuals' ability to carry out normal daily responsibilities. This can result in reduced productivity and missed days of school or work (Burton et al., 2005; Merrill et al., 2013; Schultz and Edington, 2007; Goetzel et al., 2004; Schultz, Chen, and Edington, 2009; Strömberg et al., 2017), which, in turn, is associated with increased costs.

We assessed absenteeism (i.e., lost work or school days because of health symptoms) and presenteeism (i.e., days present at work or school but with performance compromised because of health symptoms). Respondents were asked about how many days in the past 30 days their mental or physical symptoms caused them to miss school or work or to feel so impaired that, even though they went to work or school, their productivity was reduced. We calculated the average number of days of absenteeism and presenteeism. Key findings are presented in Tables 7.13 through 7.15 and include the following:

- On average, reserve component service members reported missing 0.53 days of work (i.e., absenteeism) (95-percent CI: 0.47–0.59) and experiencing reduced productivity (i.e., presenteeism) on 1.50 days (95-percent CI: 1.39–1.61) in the past 30 days (Table 7.13).
- Officers reported significantly fewer missed days of work and fewer days of reduced productivity than midlevel or senior enlisted (Table 7.14).
- Men reported fewer missed days and days of reduced productivity than women (Table 7.15).

Table 7.13
Health-Related Functional Limitations: Absenteeism and Presenteeism, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Absenteeism (average number of days lost due to mental or physical symptoms, past 30 days)	0.24[c,d] (0.16–0.32)	0.35[c,d] (0.27–0.44)	0.63[a,b,g] (0.51–0.75)	0.61[a,b,g] (0.50–0.73)	0.38 (0.18–0.58)	0.54 (0.31–0.76)	0.21 [c,d] (0.00–0.43)	0.51 (0.43–0.58)	0.55 (0.46–0.64)	0.53 (0.47–0.59)
Presenteeism (average number of days productivity impaired by mental or physical symptoms, past 30 days)	0.78[c,d,e,f] (0.62–0.94)	0.95[c,d,f] (0.78–1.11)	1.64[a,b,g] (1.42–1.85)	1.70[a,b,g] (1.49–1.91)	1.91[a,g] (1.28–2.54)	1.54[a,b,g] (1.22–1.86)	0.81[c,d,e,f] (0.45–1.16)	1.47 (1.33–1.62)	1.52 (1.36–1.69)	1.50 (1.39–1.61)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 7.14
Health-Related Functional Limitations: Absenteeism and Presenteeism, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Absenteeism (average number of days lost due to mental or physical symptoms, past 30 days)	0.50 (0.39–0.61)	0.60[e,f] (0.50–0.71)	0.72[e,f] (0.59–0.85)	0.42 (0.22–0.63)	0.33[b,c] (0.19–0.47)	0.36[b,c] (0.26–0.45)
Presenteeism (average number of days productivity impaired by mental or physical symptoms, past 30 days)	1.43 (1.22–1.64)	1.72[e,f] (1.53–1.92)	1.64[e,f] (1.43–1.84)	1.77 (1.18–2.36)	1.15[b,c] (0.91–1.39)	1.09[b,c] (0.93–1.25)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 7.15
Health-Related Functional Limitations: Absenteeism and Presenteeism, by Gender

	Men	Women
Absenteeism (average number of days lost due to mental or physical symptoms, past 30 days)	0.48[a] (0.41–0.55)	0.75 (0.64–0.85)
Presenteeism (average number of days productivity impaired by mental or physical symptoms, past 30 days)	1.36[a] (1.23–1.49)	2.04 (1.83–2.26)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Comparisons with the 2018 HRBS Active Component Sample

Table 7.16 presents comparisons of certain key outcomes in this chapter between service members in the reserve and active components. Recall that RRs and ARRs greater than 1.0 indicate that the reserve component had higher prevalence rates than the active component, whereas RRs and ARRs below 1.0 indicate that the reserve component had lower prevalence rates than the active component. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Table 7.16
Rates of Physical Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Physician-diagnosed chronic conditions		
High blood pressure	1.02 (0.92, 1.12)	0.73*** (0.66, 0.82)
Diabetes	1.31* (0.98, 1.76)	0.82 (0.61, 1.11)
High cholesterol	1.63*** (1.46, 1.81)	1.04 (0.91, 1.18)
Asthma	1.15 (0.91, 1.45)	0.81 (0.62, 1.06)
Angina or coronary heart disease	1.23 (0.72, 2.10)	0.58 (0.27, 1.25)
Heart attack	1.53 (0.72, 3.25)	0.81 (0.32, 2.07)
Back pain	0.88*** (0.83, 0.93)	0.72*** (0.67, 0.76)
Bone, joint, or muscle injury (including arthritis)	0.83*** (0.78, 0.88)	0.63*** (0.59, 0.67)
Number of medical diagnoses in past year		
No conditions	1.06*** (1.04, 1.09)	1.22*** (1.19, 1.26)
1–2 conditions	0.87*** (0.83, 0.91)	0.75*** (0.71, 0.79)
3+ conditions	1.16** (1.03, 1.30)	0.69*** (0.61, 0.79)
Physical symptoms		
Stomach or bowel problems	0.90 (0.79, 1.02)	0.79*** (0.68, 0.92)
Back pain	0.70*** (0.65, 0.76)	0.61*** (0.56, 0.66)
Pain in the arms, legs, or joints	0.71*** (0.65, 0.77)	0.55*** (0.51, 0.61)
Headaches	0.72*** (0.65, 0.81)	0.62*** (0.54, 0.70)
Chest pain or shortness of breath	0.76** (0.62, 0.95)	0.71*** (0.55, 0.91)
Dizziness	0.97 (0.79, 1.21)	0.93 (0.73, 1.18)
Feeling tired or having low energy	0.65*** (0.60, 0.70)	0.60*** (0.54, 0.65)
Trouble sleeping	0.68*** (0.63, 0.73)	0.59*** (0.54, 0.65)

Table 7.16—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Any bodily pain (back, arms, legs, or joints)	0.72*** (0.67, 0.76)	0.60*** (0.56, 0.64)
Any bodily pain including headache	0.72*** (0.68, 0.76)	0.61*** (0.57, 0.65)
High physical symptom severity	0.66*** (0.60, 0.71)	0.53*** (0.48, 0.58)
TBI and postconcussive symptoms		
Any injury	0.79*** (0.74, 0.84)	0.73*** (0.68, 0.79)
Positive screen for mild TBI	0.71*** (0.61, 0.83)	0.60*** (0.50, 0.71)
Postconcussive symptoms	0.64*** (0.53, 0.78)	0.50*** (0.40, 0.63)
Self-rated overall physical health		
Excellent	1.16*** (1.07, 1.26)	1.26*** (1.15, 1.39)
Very good	1.07*** (1.03, 1.12)	1.10*** (1.05, 1.15)
Good	0.92*** (0.88, 0.97)	0.90*** (0.85, 0.95)
Fair	0.83*** (0.74, 0.93)	0.75*** (0.66, 0.86)
Poor	0.66*** (0.49, 0.89)	0.52*** (0.37, 0.74)
Health-related functional limitations		
Absenteeism	0.86* (0.72, 1.02)	0.67*** (0.55, 0.82)
Presenteeism	0.68*** (0.62, 0.76)	0.64*** (0.57, 0.72)

NOTES: RRs and ARRs above 1.0 indicate that the reserve component had an increased prevalence of the outcome in question compared with the active component; RRs and ARRs below 1.0 indicate that the reserve component had a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Chronic Conditions

- Significantly fewer reserve component service members had high blood pressure (ARR = 0.73; CI: 0.66, 0.82); back pain (ARR = 0.72; CI: 0.67, 0.76); or bone, joint, or muscle injury (including arthritis) (ARR = 0.63; CI: 0.59, 0.67). In addition, significantly fewer reserve component members had 1–2 (ARR = 0.75; CI: 0.71, 0.79) or 3+ (ARR = 0.69; CI: 0.61, 0.79) chronic conditions diagnosed.

Physical Symptoms

- Reserve component service members were significantly less likely to report each of the individual physical symptoms assessed by the 2018 HRBS, except for dizziness. In addition, significantly fewer reserve component service members reported any bodily pain, both without headache (ARR = 0.60; CI: 0.56, 0.64) and with headache (ARR = 0.61; CI: 0.57, 0.65).
- Reserve component service members were significantly less likely to report high physical symptom severity (ARR = 0.53; CI: 0.48, 0.58).

Traumatic Brain Injury and Postconcussive Symptoms

- Reserve component service members were significantly less likely to experience an injury (ARR = 0.73; CI: 0.68, 0.79) or screen positive for mTBI (ARR = 0.60; CI: 0.50, 0.71). Note that the prevalence of moderate to severe TBI was too low to facilitate the comparison between the active component and reserve component. Reserve component service members were also less likely to report postconcussive symptoms (ARR = 0.50; CI: 0.40, 0.63).

Self-Rated Health

- Reserve component service members were significantly more likely to report that their health was very good (ARR = 1.10; CI: 1.05, 1.15) or excellent (ARR = 1.26; CI: 1.15, 1.39), compared with active component service members. There were also substantially less likely to report their health to be poor (ARR = 0.52; CI: 0.37, 0.74).

Health-Related Functional Limitations

- Reserve component service members reported significantly fewer days missed of work (absenteeism; ARR = 0.67; CI: 0.55, 0.82) and fewer days of reduced productivity (presenteeism; ARR = 0.64; CI: 0.57, 0.72) due to health symptoms.

Summary

This chapter presented analyses related to chronic conditions, physical symptoms, TBI, self-rated health, and health-related functional limitations. Overall, nearly 37 percent of service members reported being told by a health care provider that they had at least one of the eight

chronic conditions we examined. In turn, the presence of these conditions has implications for readiness and resilience, as well as health care utilization and associated costs. We found that rates of certain chronic conditions were lower than the benchmarks established by HP2020, including high blood pressure, high cholesterol, and diabetes. However, it is important to take into consideration that this might reflect selection factors and aspects of military service that can serve to maintain good cardiometabolic health (e.g., fitness requirements).

Regarding the presence of physical symptoms, the most commonly reported symptoms were related to sleep and fatigue, as well as the presence of pain. Pain-related symptoms were more common with age, but there was also evidence of disparities in the rates of pain between enlisted service members and officers, particularly in senior-level pay grades. In addition, more enlisted service members screened positive for mTBI compared with senior officers. These differences likely reflect the accumulation of factors that increase the likelihood of pain and injury across a career (e.g., participation in more training exercises), as well as differences in roles, responsibilities, and missions across pay grades. This finding also suggests the importance of efforts to prevent pain by addressing these factors.

Regarding self-rated health, most reserve component service members reported that their health was very good or excellent. Junior service members and officers reported better health than their more-senior counterparts, and men reported higher rates of excellent health than women. On average, service members lost less than one day of work or school because of mental or physical health symptoms (absenteeism) and performed with lower productivity on 1.5 days (presenteeism). Women and enlisted service members were more impacted by absenteeism and presenteeism than men and officers. This suggests some productivity loss due to health concerns.

Of note, comparisons between the active component and reserve component indicated that the reserve component reported significantly fewer chronic conditions and physical symptoms. They were also more likely to report very good or excellent health and missed significantly fewer days of work due to health concerns.

CHAPTER EIGHT

Sexual Behavior and Health

Sexual health is a key aspect of mental and physical well-being. This domain includes behaviors and outcomes related to prevention of human immunodeficiency virus (HIV), STIs, unintended pregnancy, and cancer, among others (Douglas and Fenton, 2013). Each of these can be a factor in force readiness, especially if the behavior or outcome leads to a medical status that prevents a service member from being deployed (e.g., pregnancy). Furthermore, DoD and the Coast Guard assume some cost in the treatment of STIs among reserve component members.

This chapter reports on past-year sexual risk behaviors reported by the reserve component, including having more than one sex partner, having sex with a new partner without using a condom, and not using a condom during their most-recent episode of vaginal sex. We also report the percentage of reserve component members with a past-year STI and the percentage who were at high risk for HIV infection, according to CDC guidelines (CDC, 2019b). Finally, we report the past-year percentage with an unintended pregnancy (a pregnancy the service member either caused, for male respondents, or personally experienced, for female respondents).

A second section of this chapter reports on contraceptive access, use, and methods. We report on past-year contraceptive methods used by reserve component service members during their most-recent episode of vaginal sex, the percentage of service members at risk for pregnancy who were using the most-effective methods of contraception, and, for those who experienced an unintended pregnancy in the past year, the contraceptive method used at the time the unintended pregnancy occurred. We also report on deployment-related contraceptive counseling and access. Contraception related to deployments is a key issue currently of interest to Congress, as indicated in the NDAAs of 2016 and 2017 (*National Defense Authorization Act for Fiscal Year 2016*, 2015; *National Defense Authorization Act for Fiscal Year 2017*, 2016).

In a third section of this chapter, we report on HIV testing among the reserve component overall and among those at higher risk for infection.

Comparable U.S. population data for most indicators were not available for a recent period and are reported only where available. We also compare reserve and Guard member outcomes with relevant HP2020 targets. Readers should use caution when interpreting comparisons between the 2018 HRBS results and U.S. population data or HP2020 targets because these comparisons are not necessarily statistically significant and because the military population differs from the general population in demographics (e.g., age) and other factors that are related to health. We provide CIs for U.S. estimates where available.

Each section below highlights the importance or relevance of the topic to the general population and to the military and then provides an analysis of each topic by branch of the total reserve component. When relevant, we also describe results of analyses by pay grade, age

group, gender, and race/ethnicity. Tables describing the results of analyses by age group and race/ethnicity can be found in Appendix D. Key measures used are described in the applicable section, and additional details about these measures can be found in Appendix C. All analyses demonstrated statistically significant omnibus tests (Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless otherwise noted in the tables. Only statistically significant differences that the research team subject-matter experts determined to be substantively meaningful (i.e., those that could be used to change or develop policy or that contribute to inequalities in health outcomes across subgroups) are discussed in the text.

At the end of the chapter, we present comparisons between the active and reserve components on the key outcomes presented in this chapter. These comparative results use ARRs based on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARRs can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20-percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matters for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind the base for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Sexual Risk Behaviors and Outcomes

Findings related to past-year sexual risk behaviors and outcomes across all reserve component branches are presented in Table 8.1. Key findings include the following:

- About one in seven (15.9 percent, 95-percent CI: 14.9–16.8) had more than one sex partner in the past year.
- About one in three (33.2 percent, 95-percent CI: 32.0–34.3) had sex with a new partner without using a condom in the past year.
- About one in four (23.6 percent, 95-percent CI: 22.5–24.6) used a condom the most-recent time they had vaginal sex in the past year.
- STI was reported by 1.9 percent (95-percent CI: 1.6–2.1) of reserve component personnel in the past year.
- At the time of the survey, 17.7 percent (95-percent CI: 16.7–18.7) of reserve component personnel were at high risk for HIV infection.
- Unintended pregnancy was caused or experienced by 2.5 percent (95-percent CI: 2.0–2.9) of reserve component members in the past year.

Tables 8.1 through 8.3 display the percentages of the total reserve component who engaged in past-year sexual risk behaviors, as well as related outcomes, by service branch, pay grade, and gender, respectively. Key findings include the following:

- The Marine Corps Reserve had the highest percentage of members who reported more than one sex partner in the past year (24.1 percent, 95-percent CI: 18.8–29.4) and were currently at high risk for HIV infection (24.9 percent, 95-percent CI: 19.6–30.2). These differences reached statistical significance compared with all other branches except the Army National Guard.
- The percentages of reserve component service members who reported more than one sex partner (21.2 percent, 95-percent CI: 19.3–23.2) and were at high risk for HIV (23.1 percent, 95-percent CI: 21.1–25.1) were highest among junior enlisted members (pay grades E1–E4), but junior enlisted members also had the highest rates of condom use during their most-recent vaginal sex (a protective behavior) (32.0 percent, 95-percent CI: 29.8–34.1).
- Consistent with the overall pattern of findings for pay grade, the youngest reserve component members (ages 17–24) also had the highest percentage who were at high risk for HIV (26.1 percent, 95-percent CI: 23.4–28.8) and the highest percentage who had used a condom during most-recent vaginal sex (37.4 percent, 95-percent CI: 34.4–40.3; Appendix Table D.78).
- Differences in the percentages of men versus women who had multiple sex partners, had sex with a new partner without a condom in the past year, or were at high risk for HIV were not statistically significant. However, a statistically significantly higher percentage of men (24.1 percent, 95-percent CI: 22.9–25.4) versus women (21.3 percent, 95-percent CI: 19.6–22.9) had used a condom during their most-recent vaginal sex. Comparison data for the U.S. population (age 15–44) are available from 2011–2015 National Survey of Family Growth, which found that 33.7 percent (CI: 31.9–35.5) of men (a statistically higher percentage than men serving in the reserve component) and 23.8 percent (CI: 22.4–25.2) of women (a statistically equivalent percentage to women serving in the reserve component) reported using a condom during their most-recent sex (Copen, 2017; Table 8.3).
- A statistically significantly higher percentage of women (4.0 percent, 95-percent CI: 3.2–4.7) than men (1.3 percent, 95-percent CI: 1.0–1.6) had an STI in the past year.
- Servicewomen were more likely to report experiencing an unintended pregnancy in the past year (3.2 percent, 95-percent CI: 2.5–3.9) compared with the percentage of servicemen who reported causing an unintended pregnancy (2.3 percent, 95-percent CI: 1.8–2.7). This difference is probably a result of men having incomplete information about the occurrence of unintended pregnancies. The percentage of women in the reserve component who reported experiencing an unintended pregnancy was lower than among women of reproductive age in the U.S. population (4.5 percent, CI: 4.1–4.9; Finer and Zolna, 2016).
- Non-Hispanic black members of the reserve component (23.1 percent, 95-percent CI: 20.3–25.9) were significantly more likely than non-Hispanic white (16.7 percent, 95-percent CI: 15.5–18.0), Hispanic (17.3 percent, CI: 14.8–19.9) and non-Hispanic Asian (12.4 percent, 95-percent CI 9.4–15.4) personnel to be at high risk for HIV at the time of the survey. Non-Hispanic Asian personnel had the lowest rate of unintended pregnancy (0.5 percent, 95-percent CI: 0.1–0.9) compared with reserve and Guard members in all other race/ethnicity groups (Appendix Table D.77).

Table 8.1
Past-Year Sexual Risk Behaviors and Outcomes, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
2+ sex partners in past 12 months	12.3%[d,e] (10.3–14.3)	11.7%[d,e] (10.2–13.2)	14.5%[d,e] (12.8–16.2)	18.3%[a,b,c,g] (16.5–20.1)	24.1%[a,b,c,f,g] (18.8–29.4)	13.5%[e] (10.9–16.1)	7.9%[d,e] (4.6–11.3)	14.8% (13.6–16.0)	16.7% (15.3–18.1)	15.9% (14.9–16.8)
Sex with a new partner without a condom in past year	26.3%[c,d,e,f] (23.9–28.6)	28.8%[d] (26.8–30.7)	32.9%[a] (30.7–35.2)	35.6%[a,b] (33.5–37.6)	36.6%[a] (30.5–42.7)	33.8%[a] (30.3–37.2)	32.0% (24.7–39.3)	32.2% (30.7–33.7)	34.0% (32.3–35.6)	33.2% (32.0–34.3)
Condom use during most-recent vaginal sex	22.8%[e] (20.2–25.5)	20.2%[e] (18.4–22.1)	23.4% (21.3–25.5)	24.2% (22.2–26.1)	32.0%[a,b] (26.3–37.7)	22.2% (18.5–25.9)	21.0% (13.7–28.3)	23.9% (22.5–25.4)	23.2% (21.7–24.8)	23.6% (22.5–24.6)
STI in past year[z]	1.7% (1.1–2.2)	2.1% (1.5–2.7)	2.0% (1.4–2.5)	1.6% (1.2–2.1)	1.8% (0.4–3.2)	2.6% (1.5–3.7)	1.5% (0.0–3.3)	2.0% (1.6–2.4)	1.8% (1.4–2.1)	1.9% (1.6–2.1)
High risk for HIV[1]	14.6%[d,e] (12.5–16.7)	13.7%[d,e] (12.1–15.2)	16.5%[e] (14.7–18.3)	19.8%[a,b,g] (18.0–21.7)	24.9%[a,b,c,f,g] (19.6–30.2)	15.9%[e] (13.1–18.6)	10.9%[d,e] (6.6–15.2)	16.8% (15.6–18.1)	18.4% (16.9–19.8)	17.7% (16.7–18.7)
Unintended pregnancy in past year[z]	1.9% (1.1–2.7)	1.5% (0.9–2.1)	2.2% (1.4–3.0)	2.8% (2.1–3.6)	3.7% (1.6–5.8)	2.8% (1.5–4.0)	1.8% (0.3–3.4)	2.4% (1.8–2.9)	2.5% (1.9–3.1)	2.5% (2.0–2.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table 8.2
Past-Year Sexual Risk Behaviors and Outcomes, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
2+ sex partners in past 12 months	21.2%[b,c,d,e,f] (19.3–23.2)	14.2%[a,c,f] (12.9–15.6)	7.4%[a,b,e] (6.3–8.5)	10.0%[a] (6.4–13.6)	15.2%[a,c,f] (12.9–17.6)	6.3%[a,b,e] (5.2–7.4)
Sex with a new partner without a condom in past year	33.6%[f] (31.4–35.8)	34.5%[f] (32.7–36.3)	34.4%[f] (32.6–36.2)	31.8% (26.5–37.0)	31.4%[f] (28.4–34.3)	25.1%[a,b,c,e] (23.3–27.0)
Condom use during most-recent vaginal sex	32.0%[b,c,d,e,f] (29.8–34.1)	19.9%[a,c,f] (18.3–21.4)	10.7%[a,b,e] (9.4–11.9)	11.1%[a,e] (6.5–15.8)	24.2%[a,c,d,f] (21.3–27.1)	11.9%[a,b,e] (10.5–13.3)
STI in past year[z]	1.7% (1.3–2.2)	2.3% (1.7–2.8)	1.5% (1.0–2.0)	2.3% (0.04–4.5)	1.6% (0.8–2.4)	1.7% (1.1–2.2)
High risk for HIV[1]	23.1%[b,c,d,e,f] (21.1–25.1)	16.1%[a,c,f] (14.7–17.5)	8.8%[a,b,e] (7.6–10.0)	12.6%[a] (8.5–16.8)	16.5%[a,c,f] (14.1–19.0)	8.2%[a,b,e] (6.9–9.4)
Unintended pregnancy in past year	3.1%[c,f] (2.3–3.9)	2.8%[c,f] (2.1–3.5)	0.9%[a,b] (0.5–1.3)	0.9% (0.0–2.1)	1.7% (0.7–2.7)	0.7%[a,b] (0.3–1.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table 8.3
Past-Year Sexual Risk Behaviors and Outcomes, by Gender

	Men	Women
2+ sex partners in past 12 months[z]	15.6% (14.5–16.8)	16.7% (15.1–18.3)
Sex with a new partner without a condom in past year[z]	33.4% (32.1–34.7)	32.2% (30.4–34.0)
Condom use during most-recent vaginal sex	24.1%[a] (22.9–25.4)	21.3% (19.6–22.9)
STI in past year	1.3%[a] (1.0–1.6)	4.0% (3.2–4.7)
High risk for HIV[z,1]	17.3% (16.1–18.5)	19.1% (17.4–20.7)
Unintended pregnancy in past year	2.3%[a] (1.8–2.7)	3.2% (2.5–3.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Contraceptive Use and Methods

At the end of 2016, DoD issued a memorandum (DHA-IPM 16-003, DoD, 2016) establishing comprehensive standards of care with respect to methods of contraception and counseling on methods of contraception for members of the Armed Forces (Defense Health Agency, 2016). These standards adopt the CDC's practice recommendations for contraceptive use as the clinical practice guidelines for the military. Analyses in this section examined reserve component service members' past-year contraceptive use and methods at the time of their most-recent vaginal sex and at the time they experienced (for women) or caused (for men) an unintended pregnancy. The percentage of reserve component members who reported that they or their partner used each type of birth control during their most-recent vaginal sex is shown in Table 8.4. The most commonly used methods were condoms (23.6 percent) and birth control pills (17.8 percent).

Long-acting contraception, such as an intrauterine device (IUD), has been associated with substantially lower unintended pregnancy rates, even among women who, at least initially, showed a preference for short-acting contraceptives (Hubacher et al., 2017), as well as in a convenience sample of low-income women (Winner et al., 2012). Long-acting methods are more effective, in part, because they do not require users to remember to use them or to use them correctly, as do some other methods. The most commonly used long-acting method was an IUD, used by about one in ten members of the total reserve component as their contraceptive method at last vaginal sex (Table 8.4).

Table 8.4
Method of Contraception Used During Most-Recent Vaginal Sex in Past Year

	Percentage Reporting Use
Highly effective methods	
Male sterilization (vasectomy)	8.5% (8.0–8.9)
IUD	9.6% (9.0–10.3)
Female sterilization (e.g., tubal ligation, hysterectomy)	6.3% (5.8–6.7)
Contraceptive implant (e.g., Implanon)	3.4% (2.9–3.8)
Other methods	
Condom	23.6% (22.5–24.6)
Birth control pill	17.8% (16.9–18.8)
Birth control shots, birth control patch, contraceptive ring, or a diaphragm	4.7% (4.1–5.2)
Some other method	4.8% (4.3–5.3)
No contraception or not applicable	
Did not use any form of birth control	19.1 % (18.2–20.0)
No vaginal sex in the past 12 months	15.0% (14.1–15.9)
I/my partner was trying to get pregnant	6.1% (5.6–6.6)
I/my partner was already pregnant	2.9% (2.5–3.3)

We categorized past-year contraceptive use at the time of most-recent vaginal sex among members of the reserve component into four categories (1) used highly effective (i.e., long-acting) contraception methods (e.g., contraceptive implant, IUD, or sterilization), (2) used other contraception (e.g., birth control pills, shots, patch, or ring; diaphragm; condoms; or some other method), (3) did not use contraception, or (4) contraceptive method was not applicable (e.g., did not have vaginal sex, was expecting a child, or was trying to conceive). We also explored whether these contraceptive choices were associated with unintended pregnancies among members of the reserve component.

Tables 8.5 through 8.7 display the percentages of reserve component service members falling into each of the four categories of contraceptive methods use during their most recent episode of vaginal sex and at the time an unintended pregnancy occurred. We computed this as a percentage of the group for whom contraceptive use was "applicable" for the unintended

Table 8.5
Method of Contraception, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Birth control method at the time of most-recent vaginal sex										
No contraception[z]	18.4% (16.4–20.3)	19.1% (17.5–20.7)	20.3% (18.6–22.1)	19.3% (17.7–20.9)	14.5% (9.6–19.5)	18.5% (15.5–21.6)	17.1% (12.8–21.5)	19.0% (17.8–20.2)	19.2% (18.0–20.5)	19.1% (18.2–20.0)
Highly effective contraception	30.5%[c,d,e] (28.1–32.9)	32.2%[c,d,e] (30.3–34.2)	22.5%[a,b,f] (20.7–24.2)	24.1%[a,b] (22.5–25.8)	20.0%[a,b] (15.5–24.4)	28.2%[c] (25.2–31.2)	26.8% (21.3–32.3)	24.7% (23.4–26.0)	26.1% (24.7–27.4)	25.5% (24.5–26.4)
Other contraception	30.5%[e] (27.7–33.2)	30.5%[e] (28.5–32.6)	31.9% (29.6–34.3)	33.7% (31.6–35.7)	40.9%[a,b,f] (34.9–46.9)	28.4%[e] (24.7–32.2)	32.6% (25.0–40.1)	32.0% (30.4–33.7)	32.9% (31.3–34.6)	32.5% (31.4–33.7)
Not applicable[1]	20.7% (18.3–23.0)	18.2%[c,d,f] (16.4–19.9)	25.3%[b] (23.0–27.5)	22.9%[b] (21.0–24.7)	24.6% (19.4–29.8)	24.8%[b] (21.8–27.9)	23.5% (17.5–29.5)	24.2% (22.8–25.7)	21.8% (20.3–23.2)	22.9% (21.8–23.9)
Birth control method at time of past-year unintended pregnancy[2]										
No contraception[z]	NR (46.5–90.0)	NR (23.9–62.4)	79.2% (66.1–92.3)	72.6% (60.8–84.4)	NR (32.8–92.0)	NR (33.7–79.1)	NR (NR)	70.3% (60.0–80.6)	68.5% (57.6–79.3)	69.3% (61.7–76.8)
Highly effective contraception[x]	2.4% (0.0–7.2)	5.4% (0.0–12.9)	0.0% (0.0–11.2)	2.3% (0.0–4.7)	0.0% (0.0–26.8)	0.0% (0.0–16.0)	NR (NR)	0.8% (0.0–1.9)	2.8% (0.4–5.1)	1.9% (0.5–3.3)
Other contraception[z]	NR (7.5–51.1)	NR (31.6–71.3)	20.8% (7.7–33.9)	25.0% (13.4–36.7)	NR (8.0–67.2)	NR (20.9–66.3)	NR (NR)	29.0% (18.7–39.2)	28.8% (18.1–39.5)	28.8% (21.4–36.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *Not applicable* includes service members who reported that they did not have vaginal sex during the past 12 months, were expecting a child, or were trying to conceive.

[2] Only those service members who reported experiencing or causing an unintended pregnancy in the past year are included in this portion of the table.

Table 8.6
Method of Contraception, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Birth control method method at time of most-recent vaginal sex						
No contraception	14.5%[b,c,d,f] (12.8–16.2)	21.7%[a,c,e] (20.2–23.2)	27.6%[a,b,e] (25.9–29.2)	27.3%[a,e] (22.4–32.1)	15.5%[b,c,d,f] (13.3–17.6)	24.7%[a,e] (22.9–26.4)
Highly effective contraception	14.8%[b,c,d,e,f] (13.2–16.3)	29.6%[a,c,d,f] (28.0–31.2)	40.4%[a,b,e] (38.6–42.3)	39.1%[a,b,e] (33.3–44.9)	28.7%[a,c,d,f] (25.8–31.6)	41.0%[a,b,e] (38.9–43.1)
Other contraception	41.2%[b,c,d,e,f] (38.9–43.5)	29.2%[a,c,f] (27.4–30.9)	19.0%[a,b,e] (17.4–20.6)	20.6%[a,e] (15.2–26.0)	33.2%[a,c,d,f] (30.1–36.3)	18.9%[a,b,e] (17.3–20.6)
Not applicable[1]	29.5%[b,c,d,e,f] (27.4–31.7)	19.6%[a,c,d,f] (18.2–21.0)	13.0%[a,b,e] (11.8–14.2)	13.1%[a,b,e] (9.4–16.7)	22.6%[a,c,d,f] (19.6–25.5)	15.4%[a,b,e] (13.9–17.0)
Birth control method at time of unintended pregnancy[2]						
No contraception[z]	70.4% (58.8–81.9)	72.1% (61.6–82.6)	NR (52.5–92.2)	NR (NR)	NR (18.0–78.1)	NR (21.2–74.9)
Highly effective contraception[z]	1.1% (0.0–2.8)	2.4% (0.0–4.8)	12.0% (0.0–27.6)	NR (NR)	0.0% (0.0–28.7)	0.0% (0.0–22.4)
Other contraception[z]	28.5% (17.0–40.0)	25.5% (15.2–35.8)	15.7% (1.1–30.3)	NR (NR)	NR (21.9–82.0)	NR (25.1–78.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *Not applicable* includes service members who reported that they did not have vaginal sex during the past 12 months, were expecting a child, or were trying to conceive.

[2] Only those service members who reported experiencing or causing an unintended pregnancy in the past year are included in this portion of the table.

pregnancy analysis, since an unintended pregnancy was not possible for the "not applicables." Key findings are described below.

Birth Control Use During Most-Recent Vaginal Sex

- About one in five reserve component members (19.1 percent, 95-percent CI: 18.2–20.0) did not use any birth control at their most-recent vaginal sex (Table 8.5).
- One quarter (25.5 percent, 95-percent CI: 24.5–26.4) of the reserve component reported use of highly effective birth control methods at their most-recent vaginal sex (Table 8.5).
- Methods of birth control that are less than highly effective were the most commonly used methods overall (32.5 percent, 95-percent CI 31.4–33.7; Table 8.5).
- Members of the Air Force Reserve (30.5 percent, 95-percent CI: 28.1–32.9) and Air National Guard (32.2 percent, 95-percent CI: 30.3–34.2) were the most likely to use highly effective methods of contraception. Their use of these methods was statistically

Table 8.7
Method of Contraception, by Gender

	Men	Women
Birth control method at time of most-recent vaginal sex		
No contraception[z]	19.2% (18.1–20.2)	19.0% (17.4–20.6)
Highly effective contraception[z]	25.3% (24.2–26.4)	25.9% (24.4–27.5)
Other contraception[z]	32.6% (31.2–33.9)	32.4% (30.6–34.3)
Not applicable[z,1]	23.0% (21.7–24.2)	22.6% (21.0–24.2)
Birth control method at time of unintended pregnancy[2]		
No contraception[z]	71.2% (61.7–80.7)	63.9% (53.3–74.4)
Highly effective contraception[z]	1.2% (0.0–2.4)	3.9% (0.0–7.8)
Other contraception[z]	27.6% (18.1–37.0)	32.3% (22.1–42.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *Not applicable* includes service members who reported that they did not have vaginal sex during the past 12 months, were expecting a child, or were trying to conceive.

[2] Only those service members who reported experiencing or causing an unintended pregnancy in the past year are included in this portion of the table.

significantly more common than use by members of the Army Reserve (22.5 percent, 95-percent CI: 20.7–24.2), Army National Guard (24.1 percent, 95-percent CI: 22.5–25.8), and the Marine Corps Reserve (20.0 percent, 95-percent CI: 15.4–24.4; Table 8.5).

- The percentage of service members who did not use any contraception was lowest among junior enlisted personnel (pay grades E1–E4; 14.5 percent, 95-percent CI 12.8–16.2) and junior officers (O1–O3; 15.5 percent, 95-percent CI: 13.3–17.6) compared with all other pay grades (Table 8.6).
- The percentage of service members who used highly effective birth control methods was lowest (14.8 percent, 95-percent CI: 13.2–16.3), and the percentage who used other methods was highest (41.2 percent, 95-percent CI: 38.9–43.5), among junior enlisted personnel compared with all other pay grades (Table 8.6).
- There were no statistically significant differences in the percentages of servicemen versus servicewomen using any of the birth control categories (Table 8.7).
- The percentage of reserve and Guard members who used highly effective birth control methods was significantly higher among non-Hispanic white personnel (29.4 percent, 95-percent CI: 28.2–30.7) than among non-Hispanic black (17.1 percent, 95-percent CI:

14.9–19.3), Hispanic (20.7 percent, 95-percent CI: 18.4–23.0), and non-Hispanic Asian (14.3 percent, 95-percent CI: 11.6–17.0) personnel (Appendix Table D.79).
- The percentages of reserve component members who did not use any birth control (12.4 percent, 95-percent CI: 10.2–14.6) and who used highly effective birth control (12.8 percent, 95-percent CI: 10.8–14.8) were lowest among the youngest service members (ages 17–24) compared with all other age groups. The youngest service members also had the highest percentage who were using other (less than highly effective) birth control methods (45.3 percent, 95-percent CI: 42.3–48.4; Appendix Table D.80).

Birth Control Use at the Time of Unintended Pregnancy

- At the time an unintended pregnancy occurred, most reserve component personnel were not using any birth control (69.3 percent, 95-percent CI: 61.7–76.8), 1.9 percent (95-percent CI: 0.5–3.3) reported using highly effective birth control methods, and 28.8 percent (95-percent CI: 21.4–36.3) reported using other (less than highly effective) birth control methods (Table 8.5).
- Differences in contraceptive method used at the time of unintended pregnancy by service branch (Table 8.5), pay grade (Table 8.6), gender (Table 8.7), race/ethnicity (Appendix Table D.79), and age group (Appendix Table D.80) were not statistically significant. Note, however, that we had limited ability to test for differences across subgroups given the small number of reserve component members who reported an unintended pregnancy. This low prevalence also produced wide CIs for our estimates and prevented us from presenting some estimates.

The HP2020 target for the proportion of women 15–44 years of age at risk of unintended pregnancy who used (or whose partners used) contraception at most recent sexual intercourse is 91.6 percent (Healthy People, 2020a). The most recent civilian estimate available, based on 2015–2017 data from the National Survey of Family Growth (NSFG; available on the HP2020 website), is 79.6 percent (CI: 76.7–82.2 percent). The HP2020 measure and age grouping is not fully reproducible with HRBS data but can be approximated. To do so, we computed the percentage of women in the reserve component 17–44 years of age who reported using a contraceptive method at their last vaginal sex, with a denominator of women aged 17–44 who had vaginal sex in the past 12 months and were not pregnant, nor seeking pregnancy, nor (themselves or their partners) surgically sterile.

- We found that 73.8 percent (95-percent CI: 71.4–76.1) of servicewomen under age 45 who were at risk of unintended pregnancy used contraception during their most-recent episode of vaginal sex (Table 8.8), far below the HP2020 target and also substantially below the most-comparable national data.

Data from the 2015–2017 NSFG show that 60.2 percent (CI: 57.4–63.0) of U.S. women 20–44 who were not already pregnant or trying to become pregnant used a most-effective or moderately effective method of contraception (i.e., sterilization or use of a contraceptive implant; IUD; birth control pills, shots, patch, or ring; or a diaphragm; data available on HP2020 website at Healthy People, 2020b). The HP2020 target is 69.3 percent or higher (Healthy People, 2020b).

Table 8.8
HP2020 Outcomes, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Used contraception at last vaginal sex[1,z]	78.1% (74.0–82.1)	79.0% (75.3–82.6)	71.4% (66.8–75.9)	73.5% (69.6–77.3)	NR (50.7–84.7)	70.3% (57.3–83.4)	73.9% (62.4–85.3)	72.6% (69.0–76.2)	74.8% (71.7–77.9)	73.8% (71.4–76.1)
Used moderately or most-effective birth control method at last vaginal sex[2]	65.8%[c] (61.6–70.1)	65.7%[c] (61.8–69.6)	55.7%[a,b] (50.7–60.8)	59.7% (55.5–63.9)	NR (30.9–63.5)	63.5% (57.0–69.9)	54.0% (41.2–66.9)	59.3% (56.1–62.4)	61.3% (58.1–64.6)	60.3% (58.1–62.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] Calculated among servicewomen age 44 and under who were at risk for unintended pregnancy, defined as those who had vaginal sex during the past 12 months and were not pregnant, seeking to become pregnant, or surgically sterilized.

[2] Calculated among servicewomen age 20–44 who had vaginal sex during the past 12 months and were not pregnant or seeking to becoming pregnant.

- In the 2018 HRBS, 60.3 percent (95-percent CI: 58.1–62.6) of women ages 20–44 in the reserve component who were not already pregnant or trying to become pregnant used a most- or moderately effective method of contraception (Table 8.8). This is comparable with national data but 9 percentage points short of the HP2020 goal.

Deployment-Related Unintended Pregnancy, Contraceptive Access and Counseling

As noted earlier, an unintended pregnancy while deployed presents challenges for servicewomen and operational difficulties that can be a threat to force lethality and readiness. NDAA 2016 Section 718 required that servicewomen have access to comprehensive counseling on the full range of contraceptive methods at medical visits predeployment and during deployment, and NDAA 2017 Section 747 further directed that information be obtained on the experiences of service members in accessing family planning services and counseling. DoD memorandum DHA-IPM 16-003 also requires that contraceptive counseling be delivered at annual physical health assessments, as well as at predeployment and during-deployment health care visits. To address these issues and directives, we examined incidence of unintended pregnancy during a past-year deployment, receipt of contraceptive counseling prior to deployment, and ability to get and refill preferred birth control methods before and during deployment.

The implications of these outcomes are very different for female versus male service members. Though it is problematic for either gender to lack access to contraception, for servicewomen, lack of access while deployed may result in unintended pregnancy during deployment and problems such as duty reassignment and/or evacuation from theater, as noted previously. Therefore, we present the outcomes for men and women separately, where possible. All percentages in this section are of those reserve component members who had deployed in the past year, rather than reserve component members overall (see Chapter Ten in this report for more information on deployment experiences). The small number of individuals in our sample who had deployed in the year prior to survey limits our ability to test for differences across service branch and pay grade and resulted in fairly wide CIs around the estimates for these subgroups. The reader should consider these issues in interpreting results.

Key findings include the following:

- Less than one in 1,000 reserve component members (0.02 percent, 95-percent CI: 0.00–0.05) experienced an unintended pregnancy during a past-year deployment. We were unable to generate reliable estimates of this outcome by subgroup, given the very low incidence.

Key findings for women include the following:

- Overall, 33.4 percent (95-percent CI: 29.3–37.5) of female reserve component members reported receiving contraceptive counseling prior to deployment (Table 8.9), with no differences by service branch (Table 8.9), pay grade (Table 8.10) or age group (Appendix Table D.82) reaching statistical significance. A larger percentage of Hispanic women (47.3 percent, 95-percent CI: 36.4–58.1) than non-Hispanic white women (25.4 percent,

Table 8.9
Deployment-Related Contraceptive Counseling and Access (Women Only), by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Contraceptive counseling prior to deployment[z]	33.2% (24.0–42.4)	29.0% (21.0–37.1)	33.7% (25.5–41.8)	33.1% (24.9–41.4)	NR (NR)	43.9% (31.3–56.5)	7.8% (0.0–16.7)	34.9% (29.3–40.5)	31.8% (25.6–38.0)	33.4% (29.3–37.5)
Able to get or refill preferred birth control before being deployed[z]	79.5% (66.0–93.0)	87.7% (77.5–97.9)	80.6% (70.4–90.7)	81.0% (70.9–91.1)	NR (NR)	85.8% (72.4–99.2)	NR (NR)	81.8% (74.8–88.8)	82.8% (74.9–90.8)	82.3% (77.1–87.6)
Able to get or refill preferred birth control while deployed[z]	NR (25.4–72.1)	87.1% (75.5–98.8)	74.8% (61.0–88.7)	76.1% (64.0–88.2)	NR (NR)	NR (48.6–87.5)	NR (NR)	68.0% (57.3–78.6)	78.4% (68.3–88.5)	73.7% (66.5–80.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 8.10
Deployment-Related Contraceptive Counseling and Access (Women Only), by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Contraceptive counseling prior to deployment[z]	35.7% (25.3–46.1)	34.7% (28.5–40.9)	33.4% (25.9–40.9)	NR (0.0–36.7)	33.1% (22.3–44.0)	21.6% (13.6–29.6)
Able to get or refill preferred birth control before being deployed[z]	82.4% (71.1–93.6)	81.9% (73.9–89.9)	87.9% (79.3–96.4)	NR (NR)	NR (63.2–93.2)	NR (60.3–99.2)
Able to get or refill preferred birth control while deployed[z]	82.6% (68.0–97.1)	73.8% (62.6–85.0)	76.8% (62.1–91.6)	NR (NR)	NR (43.5–83.0)	NR (38.3–81.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

95-percent CI: 20.2–30.7) received predeployment contraceptive counseling, but no other differences by race/ethnicity reached statistical significance (Appendix Table D.81).

- A large majority of women who sought access to birth control reported that they were able to get or refill their preferred method before being deployed (82.3 percent, 95-percent CI: 77.1–87.6) and while deployed (73.7 percent, 95-percent CI: 66.5–80.9; Table 8.9). There were no statistically significant differences in these outcomes by service branch (Table 8.9), pay grade (Table 8.10), race/ethnicity (Appendix Table D.81), or age group (Appendix Table D.82).

Key findings for men include the following:

- Overall, 15.2 percent (95-percent CI: 13.1–17.3) of male reserve component members reported contraceptive counseling prior to deployment (Table 8.11), with no statistically significant differences by pay grade (Table 8.12), race/ethnicity (Appendix Table D.83), or age group (Appendix Table D.84). The percentage of male reserve component members who received predeployment contraceptive counseling was lowest in the Army Reserve (8.7 percent, 95-percent CI: 5.3–12.2), which was statistically significantly lower than the Air National Guard (17.0 percent, 95-percent CI: 13.4–20.5) and the Coast Guard Reserve (27.4 percent, 95-percent CI: 12.6–42.2; Table 8.11).
- Among servicemen who sought birth control, 12.2 percent (95-percent CI: 7.2–17.1) reported being able to access their preferred method before being deployed, and 14.0 percent (95-percent CI: 8.2–19.8) reported being able to access their preferred method while deployed (Table 8.11). Differences in access to preferred birth control before deployment were not significant across service branches (Table 8.11), pay grades (Table 8.12), race/ethnicity groups (Appendix Table D.83), or age groups (Appendix Table D.84).

Table 8.11
Deployment-Related Contraceptive Counseling and Access (Men Only), by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Contraceptive counseling prior to deployment	17.9% (11.9–23.9)	17.0%[c] (13.4–20.5)	8.7%[b,g] (5.3–12.2)	15.1% (10.8–19.4)	23.1% (9.8–36.4)	19.1% (12.4–25.8)	27.4%[c] (12.6–42.2)	14.5% (11.6–17.3)	15.8% (12.8–18.8)	15.2% (13.1–17.3)
Able to get or refill preferred birth control before being deployed[z]	NR (0.0–30.6)	8.7% (0.0–18.9)	9.1% (0.4–17.9)	10.3% (1.7–18.9)	NR (NR)	NR (4.6–39.0)	NR (NR)	14.5% (7.3–21.8)	9.9% (3.0–16.8)	12.2% (7.2–17.1)
Able to get or refill preferred birth control while deployed[z]	NR (0.0–34.4)	12.6% (1.6–23.5)	14.3% (0.9–27.7)	10.7% (1.3–20.1)	NR (NR)	15.4% (2.2–28.6)	NR (NR)	17.5% (8.2–26.7)	11.2% (3.7–18.7)	14.0% (8.2–19.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 8.12
Deployment-Related Contraceptive Counseling and Access (Men Only), by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Contraceptive counseling prior to deployment[z]	15.5% (9.9–21.0)	16.8% (13.5–20.1)	14.6% (11.4–17.7)	15.5% (6.2–24.8)	14.2% (8.6–19.8)	8.9% (5.9–12.0)
Able to get or refill preferred birth control before deployed[x]	20.1% (6.5–33.6)	7.4% (2.2–12.7)	7.6% (2.0–13.1)	NR (NR)	11.6% (0.0–25.4)	NR (8.9–44.9)
Able to get or refill preferred birth control while deployed[x]	NR (11.7–42.1)	6.6% (2.0–11.3)	7.4% (1.5–13.3)	NR (NR)	NR (NR)	NR (1.5–38.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

- Differences in access to preferred birth control while deployed were not significant across service branches (Table 8.11), pay grades (Table 8.12), race/ethnicity groups (Appendix Table D.83), or age group (Appendix Table D.84).

HIV Testing

The CDC recommends annual testing for HIV among those at high risk and suggests that men who have sex with men (MSM) consider testing every three to six months (CDC, 2019b). DoDI 6485.01, 2013, requires screening at least every two years, and an HIV test result on file (within the past 24 months) is required to deploy (DoDI 6490.03, 2006; DoD, 2014). As noted earlier, the 2018 HRBS used CDC guidelines to define those at high risk for HIV infection (CDC, 2019b).[1] Key findings include the following:

- Among the reserve component, 71.4 percent (95-percent CI: 70.2–72.5) reported having been tested for HIV in the past 12 months. More than half of these individuals, 38.5 percent (95-percent CI: 37.3–39.6) of all reserve component personnel, had been tested in the past six months (Table 8.13).
- Those serving in the Army National Guard were least likely to have been tested in the past 12 months (67.2 percent, 95-percent CI: 65.1–69.3) and were tested at statistically significantly lower rates than service members in the Air National Guard (76.7 percent,

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table 8.13
HIV Testing, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
HIV test in past 12 months	71.8%[b] (69.2–74.4)	76.7%[a,d] (74.9–78.5)	73.5%[d] (71.3–75.7)	67.2%[b,c,f] (65.1–69.3)	70.9% (65.4–76.4)	77.8%[d] (74.3–81.4)	78.1% (71.0–85.2)	73.7% (72.2–75.2)	69.5% (67.8–71.1)	71.4% (70.2–72.5)
HIV test in past 6 months	34.8%[c] (32.2–37.5)	37.5%[c] (35.4–39.6)	42.6%[a,b,d] (40.2–45.0)	36.4%[c] (34.4–38.4)	40.2% (34.0–46.3)	41.6% (37.9–45.3)	40.0% (33.1–46.9)	40.7% (39.0–42.3)	36.6% (35.0–38.3)	38.5% (37.3–39.6)
High risk[1] for HIV tested in past 12 months[z]	81.7% (74.8–88.6)	82.8% (78.4–87.3)	83.2% (78.4–88.0)	76.1% (71.2–81.0)	74.0% (62.5–85.4)	84.4% (76.7–92.0)	NR (56.6–95.1)	81.6% (78.1–85.1)	77.3% (73.1–81.4)	79.1% (76.3–81.9)
MSM tested in past 6 months[z]	NR (41.1–82.4)	NR (40.3–83.6)	79.3% (65.1–93.5)	63.7% (49.6–77.8)	NR (NR)	NR (38.2–76.7)	NR (NR)	71.4% (61.6–81.2)	63.5% (50.8–76.1)	67.3% (59.4–75.3)
MSM tested in past 12 months[z]	NR (56.6–94.9)	NR (67.6–98.1)	89.4% (79.1–99.7)	82.4% (70.7–94.0)	NR (NR)	NR (60.6–96.6)	NR (NR)	86.1% (78.7–93.6)	82.4% (72.1–92.8)	84.2% (77.8–90.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

95-percent CI: 74.9–78.5), Army Reserve (73.5 percent, 95-percent CI: 71.3–75.7), and Navy Reserve (77.8 percent, 95-percent CI: 74.3–81.4).

- Individuals serving in the Army Reserve were most likely to have been tested in the past six months (42.6 percent, 95-percent CI: 40.2–45.0; Table 8.13). This percentage was statistically significantly higher than the Air Force Reserve (34.8 percent, 95-percent CI: 32.2–37.5), the Air National guard (37.5 percent, 95-percent CI: 35.4–39.6), and the Army National Guard (36.4 percent, 95-percent CI: 34.4–38.4).
- Rates of HIV testing in the past 12 months were statistically significantly lower among junior enlisted personnel (pay grades E1–E4; 64.4 percent, 95-percent CI: 62.2–66.7) compared with all other pay grades (Table 8.14) and statistically significantly lower among the youngest personnel (ages 17–24) (61.0 percent, 95-percent CI: 58.0–64.0) compared with all other age groups (Appendix Table D.86).
- Rates of HIV testing in the past 12 months were statistically significantly lower among reserve component men (70.8 percent, 95-percent CI: 69.5–72.2) than servicewomen (73.5 percent, 95-percent CI: 71.8–75.2), but there was no statistically significant difference by gender for HIV testing in the past six months (Table 8.15).
- Rates of HIV testing were significantly lower among non-Hispanic Asian members of the reserve component for the past six months (30.4 percent, 95-percent CI: 26.6–34.3) and past 12 months (62.0 percent, 95-percent CI: 57.2–66.7) than all other race/ethnicity groups except those in the Other race/ethnicity group (Appendix Table D.85).

Among those at high risk for HIV, we found that:

- The rate of past-12-month HIV testing among reserve component members at high risk for HIV was 79.1 percent (95-percent CI: 76.3–81.9) and did not differ significantly by service branch (Table 8.13) or gender (Table 8.15).
- Testing of service members at high risk for HIV was statistically significantly more common among E5 and E6 pay grades (84.9 percent, 95-percent CI: 81.6–88.3) than among junior enlisted service members (75.1 percent, 95-percent CI: 70.5–79.7).

The HP2020 goal for HIV testing among MSM is for 68.4 percent to have had an HIV test in the past year (Healthy People, 2020e). Data from the National HIV Behavioral Surveillance report indicate that in 2017, 77 percent of men who had sex with men in the United States reported a past-year HIV test (Cha et al., 2019). HIV testing among male reserve component service members who reported having sex with men in the past 12 months is shown in Tables 8.13 through 8.15, as well as Appendix Tables D.85 and D.86.

- Overall, 84.2 percent (95-percent CI: 77.8–90.6) of servicemen who had sex with men reported a past-12-month HIV test, and 67.3 percent (95-percent CI: 59.4–75.3) reported a test within the past six months. There were no significant differences in these testing rates by service branch (Table 8.13), pay grade (Table 8.14), race/ethnicity (Appendix Table D.85), and age group (Appendix Table D.86), but our ability to test these differences was highly constrained by the small number of MSM in these subgroups.

Table 8.14
HIV Testing, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
HIV test in past 12 months	64.4%[b,c,d,e,f] (62.2–66.7)	77.6%[a,e] (76.0–79.1)	77.5%[a,e] (76.0–79.0)	79.0%[a] (74.5–83.6)	71.8%[a,b,c] (68.5–75.0)	74.3%[a] (72.5–76.2)
HIV test in past 6 months	39.0%[f] (36.8–41.3)	40.3%[c,f] (38.5–42.1)	35.8%[b] (33.9–37.6)	37.7% (31.9–43.5)	36.7% (33.7–39.8)	33.4% [a,b] (31.4–35.3)
High risk[1] for HIV tested in past 12 months	75.1%[b] (70.5–79.7)	84.9%[a] (81.6–88.3)	83.7% (78.8–88.7)	89.3% (79.6–99.0)	84.0% (77.6–90.3)	75.5% (68.5–82.4)
MSM tested in past 6 months[z]	72.2% (59.9–84.6)	56.1% (43.6–68.7)	NR (50.2–90.8)	NR (NR)	NR (54.7–91.3)	NR (45.1–83.7)
MSM tested in past 12 months[z]	84.6% (74.6–94.6)	80.2% (70.0–90.4)	93.4% (85.4–100.0)	NR (NR)	86.2% (71.3–100.0)	88.6% (73.8–100.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table 8.15
HIV Testing, by Gender

	Men	Women
HIV test in past 12 months	70.8%[a] (69.5–72.2)	73.5% (71.8–75.2)
HIV test in past 6 months[z]	38.4% (37.0–39.8)	38.7% (36.8–40.6)
High risk[1] for HIV tested in past 12 months[z]	78.9% (75.6–82.3)	79.9% (75.4–84.4)
MSM tested in past 6 months	67.3% (59.4–75.3)	NA
MSM tested in past 12 months	84.2% (77.8–90.6)	NA

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Comparisons with the 2018 HRBS Active Component Sample

Table 8.16 presents comparisons of the key outcomes in this chapter between service members in the reserve and active components. Recall that RRs and ARRs greater than 1.0 indicate that the reserve component had higher prevalence rates than the active component, whereas RRs and ARRs below 1.0 indicate that the reserve component had lower prevalence rates than the active component. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Sexual Risk Behaviors

- The percentage of reserve component service members who had more than one sex partner during the past year was statistically significantly lower than among active component service members (ARR = 0.80, CI: 0.73, 0.88). Reserve component service members were 20 percent less likely to report multiple sex partners.
- The percentage of reserve component service members who had sex with a new partner without using a condom during the past year was statistically significantly lower than among active component service members (ARR = 0.94, CI: 0.89, 1.00).
- The percentage of reserve component service members who used a condom at most-recent vaginal sex was marginally significantly higher than among active component service members, by roughly 8 percent (ARR = 1.08, CI: 1.00, 1.16).
- The prevalence of past-year STI was statistically significantly lower among reserve component service members than among active component service members (ARR = 0.56, CI: 0.45, 0.71). The rate of STIs among active component service members was almost twice that of reserve component service members. Note, however, that STIs are a very low prevalence outcome, so this difference does not represent a large proportion of either population.
- The percentage of reserve component service members who were at high risk for HIV was statistically significantly lower than among active component service members (ARR = 0.80, CI: 0.73, 0.87). The proportion of reserve component service members who were at high risk for HIV was 20 percent lower than among active component service members.

Contraceptive Use and Methods

- Reserve component service members did not significantly differ from active component service members with respect to the prevalence of past-year unintended pregnancy.
- The percentage of reserve component service members who reported that they did not use any birth control at most-recent vaginal sex was statistically significantly higher than among active component service members in the unadjusted model (RR = 1.14, CI: 1.06, 1.22), but this finding was no longer significant in the adjusted model (ARR = 1.01, CI: 0.94, 1.10).

Table 8.16
Sexual Health Outcomes in the Reserve Component Relative to the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Sexual risk behaviors		
2+ sex partners in past 12 months	0.82*** (0.76, 0.89)	0.80*** (0.73, 0.88)
Sex with a new partner without a condom in past year	0.95** (0.91, 1.00)	0.94** (0.89, 1.00)
Condom use during most-recent vaginal sex	0.99 (0.93, 1.06)	1.08* (1.00, 1.16)
STI in past year	0.55*** (0.45, 0.67)	0.56*** (0.45, 0.71)
High risk for HIV	0.81*** (0.75, 0.87)	0.80*** (0.73, 0.87)
Contraceptive use and methods		
Unintended pregnancy in past year	0.84 (0.68, 1.05)	1.04 (0.82, 1.34)
No contraception at most-recent vaginal sex	1.14*** (1.06, 1.22)	1.01 (0.94, 1.10)
Highly effective contraception at most-recent vaginal sex	1.00 (0.95, 1.06)	0.94** (0.89, 1.00)
Other contraception at most-recent vaginal sex	0.96* (0.91, 1.00)	1.04 (0.98, 1.10)
Birth control at most-recent vaginal sex not applicable	0.96 (0.90, 1.03)	0.99 (0.92, 1.07)
Used IUD at most-recent vaginal sex	0.97 (0.88, 1.07)	1.13** (1.02, 1.25)
Used contraceptive implant at most-recent vaginal sex	0.56*** (0.48, 0.66)	0.72*** (0.59, 0.86)
Women 18–44 who used contraception at most-recent vaginal sex	0.96** (0.92, 1.00)	0.97 (0.92, 1.02)
Women 20–44 who used a moderately or most effective birth control method at most-recent vaginal sex	0.93*** (0.88, 0.98)	0.95* (0.89, 1.00)
Deployment-related unintended pregnancy, contraceptive access, and counseling		
Contraceptive counseling prior to deployment	1.04 (0.90, 1.20)	1.13 (0.96, 1.33)
Able to get or refill preferred birth control before being deployed	0.90 (0.74, 1.09)	0.93 (0.76, 1.14)
Able to get or refill preferred birth control while deployed	0.82 (0.64, 1.07)	0.86 (0.65, 1.13)
HIV testing		
HIV test in past 12 months	0.94*** (0.92, 0.96)	0.94*** (0.92, 0.96)

Table 8.16—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
HIV test in past 6 months	1.01 (0.96, 1.05)	1.00 (0.95, 1.05)
High risk for HIV tested in past 12 months	0.97 (0.93, 1.02)	0.96* (0.91, 1.01)
MSM tested in past 6 months	1.33*** (1.08, 1.63)	1.19 (0.96, 1.47)
MSM tested in past 12 months	1.07 (0.95, 1.21)	1.03 (0.91, 1.15)

NOTES: RRs and ARRs above 1.0 indicate that the reserve component had an increased prevalence of the outcome in question compared with the active component; RRs and ARRs below 1.0 indicate that the reserve component had a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

- The percentage of service members who reported that they used a highly effective birth control method at most-recent vaginal sex was statistically significantly lower in the reserve than in the active component (ARR = 0.94, CI: 0.89, 1.00). This difference likely reflects the statistically significantly lower rate of contraceptive implant use among the reserve component (ARR = 0.72, CI: 0.59, 0.86). However, the percentage of reserve component service members who used an IUD at most-recent sex was statistically significantly higher than the percentage among active component service members in the adjusted model (ARR = 1.13, CI: 1.02, 1.25).
- The percentage of servicewomen aged 18 to 44 years old who used contraception at most-vaginal sex in the reserve component was statistically significantly lower than the percentage among active component service members in the unadjusted model (RR = 0.96, CI: 0.92, 1.00), but this finding was not significant in the adjusted model (ARR = 0.97, CI: 0.92, 1.02).
- The percentage of servicewomen ages 20 to 44 in the reserve component who used moderately or most-effective birth control methods at most-recent vaginal sex was statistically significantly lower than the percentage among active component service members in the unadjusted model (RR = 0.93, CI: 0.88, 0.98), but this finding was only marginally significant in the adjusted model (ARR = 0.95, CI: 0.89, 1.00).

Deployment-Related Unintended Pregnancy, Contraceptive Access, and Counseling

- Reserve component service members did not significantly differ from active component service members with respect to the percentages who received contraceptive counseling

prior to deployment or who reported that they were able to get or refill their preferred birth control method prior to or during deployment.

HIV Testing

- The percentage of reserve component service members who received an HIV test in the past 12 months was statistically significantly lower than the percentage among active component service members (ARR = 0.94, CI: 0.92, 0.96).
- Reserve component service members did not statistically significantly differ from active component service members with respect to rates of past-six-month HIV testing.
- The percentage of reserve component service members at high risk for HIV who received an HIV test in the past 12 months was marginally statistically significantly lower than the percentage among active component service members in the adjusted model (ARR = 0.96, CI: 0.91, 1.01).
- The percentage of MSM in the reserve component who received an HIV test in the past six months was statistically significantly higher than among active component service members in the unadjusted model (RR = 1.33, CI: 1.08, 1.63), but this finding was no longer significant in the adjusted model (ARR = 1.19, CI: 0.96, 1.47). No statistically significant differences were observed in the percentages of MSM that had an HIV test in the past 12 months across the two populations.

Summary

Sexual behavior that creates risk for HIV, other STIs, and unintended pregnancy is not uncommon among members of the reserve component. However, the percentages of reserve component members who reported some past-year sexual risk behaviors (multiple sex partners, sex with a new partner without using a condom) or who were at high risk for HIV at the time of the survey were significantly lower, by 5–20 percent, whereas the percentage who used a condom during most-recent vaginal sex (a protective behavior) was marginally significantly higher than the corresponding percentages among active component members. Rates of STIs were also significantly lower, by almost 50 percent, in the reserve component, as compared with the active component. The rate of unintended pregnancies did not differ significantly between the reserve and active components.

Reserve component members were less likely than their active component peers to be using the most highly effective birth control methods in the adjusted model. This difference is likely accounted for by the difference in the rate of use for contraceptive implants (one of the most highly effective methods), which was significantly lower among members of the reserve component than the active component. However, the rate of IUD use, another highly effective method, was significantly higher in the reserve component than the active component in the adjusted model. The percentages of personnel who reported not using any contraception did not differ between the reserve and active components in the adjusted model. Overall, the contraceptive methods most commonly used by reserve component members were less than highly effective, and the reserve component fell far short of the HP2020 goal for use of *any* contraceptive method at last intercourse among women at risk for pregnancy (73.8 percent

versus 91.6 percent), as well as short of the HP2020 goal for use of moderately or most-effective birth control methods at last intercourse (60.3 percent versus 69.3 percent).

Between three and four in 100 women in the reserve component reported a past-year unintended pregnancy. This may be somewhat lower than the overall U.S rate, though direct comparison to the latter is not possible. Most unintended pregnancies involved sex without use of birth control, though about one in four occurred when service members reported using less-effective methods. Encouraging use of more-effective methods (among service members who find them acceptable and for whom they are medically appropriate), educating service members in correct use of less-effective methods, and encouraging use of digital apps and other reminders to assist personnel in using short-acting methods consistently might help to reduce unintended pregnancy rates.

The Marine Corps Reserve had the highest percentages of members who reported having more than one sex partner during the past year and were at high risk for HIV infection at the time of the survey. However, rates of STIs and unintended pregnancies did not differ by service branch, and there were few other clear differences across the reserve component service branches in rates of other sexual risk behaviors and outcomes.

There were some differences in sexual risk behaviors and outcomes across pay grades and age groups. The most-junior personnel and the youngest personnel were the most likely to be at high risk for HIV. Junior and younger personnel were also least likely to use the most highly effective contraception methods and the most likely to be using other methods. However, junior and younger personnel were also the least likely to report not using any contraception and had the highest rates of condom use. Non-Hispanic Asian members of the reserve component had the lowest rate of unintended pregnancies. There were few other clear differences in rates of sexual risk behaviors and outcomes by racial/ethnic group.

Some service members who wished to access birth control prior to or during deployment, particularly men, reported trouble doing so. About one in five women and six in seven men could not get the method they preferred. The low rate of access through the MHS among men may be a result of TRICARE policies that do not cover condoms. Although we did not ask men what their preferred method of contraception was, our results for method at last sex indicated that a plurality of servicemen used condoms as their method of contraception. Furthermore, only 33.4 percent of women and 15.2 percent of men in the reserve component received counseling about contraception prior to deployment, despite the requirement to provide this counseling in the 2016 NDAA, indicating that more progress is needed. There were no statistically significant differences between the reserve and active components in rates of contraceptive counseling or access to birth control before or during deployment.

Most members of the reserve component were tested for HIV during the past 12 months, and members of the reserve component were significantly more likely to have received an HIV test in the past 12 months compared with the active component. Also, the reserve component is exceeding the HP2020 target for the percentage of MSM who have had an HIV test in the past year. Still, a notable percentage of both MSM and those at high risk (more broadly defined), about one in five, went untested during this recommended period. Given the potential impact of untreated HIV infection on readiness and the potential for spread of untreated infection, it could be useful to intervene with health care providers and/or service personnel to increase rates of testing among those at high risk.

CHAPTER NINE

Sexual Orientation and Health

The health issues and needs of lesbian, gay, or bisexual (LGB) individuals differ somewhat from those of their peers (Institute of Medicine, 2011). In the general U.S. population, LGB adults are more likely to smoke cigarettes, binge drink and drink heavily, use marijuana and other illicit drugs, misuse opioids, and suffer from a variety of chronic health conditions compared with their heterosexual peers (Duncan et al., 2019; Fredriksen-Goldsen et al., 2017; Gonzales and Henning-Smith, 2017; Gonzales, Przedworski, and Henning-Smith, 2016; Schuler et al., 2018; Schuler, Stein, and Collins, 2019). Recent national data indicate that sexual minorities are also more likely to have had any mental illness, serious mental illness, serious psychological distress, and/or a major depressive episode in the past year (Medley et al., 2016; Ward et al., 2014). LGB individuals might also be less likely to access routine health care (Institute of Medicine, 2011), though they are more likely to access mental health services than the general population (Cochran, Mays, and Sullivan, 2003). Any similar disparities in health behavior and outcomes among LGB individuals serving in the military could affect readiness.

This chapter provides an estimate of the percentage of men and women serving in the reserve component who are LGB and key information about the health-related behavior and health status of LGB service members. The chapter begins with an overview of the LGB population serving in the reserve component. Sexual orientation can be measured as (1) relative attraction to the same sex compared with the opposite sex, (2) sexual activity with others of the same sex, and (3) sexual identity (i.e., whether one sees oneself as gay, lesbian, or bisexual) (Savin-Williams, 2009). We provide estimates of the percentage of personnel who were LGB in 2018 based on same-sex activity and sexual identity. We also provide the percentages of LGB-identified personnel by service branch, pay grade, and gender, with estimates by race/ethnicity and age group available in Appendix D.

Thereafter, we focus on sexual identity as it relates to health. We explore disparities between LGB and non-LGB-identified service members with regard to health promotion (routine checkups, weight status, physical activity, and sleep), substance use, mental health and use of mental health services, physical health (physician-diagnosed chronic conditions, pain, and injuries), unwanted sexual contact and physical abuse, and sexual and reproductive health. Measures used are described in applicable chapters of this report, and additional details about these measures may be found in Appendix C. We focus on the health status and behavior of the combined LGB reserve component population. Although it is likely that there are differences in health-related behavior and outcomes by subgroup (e.g., bisexuals may differ from gay and lesbian service members, LGB men may differ from LGB women), these subgroups each make up a very small fraction of the reserve component service member population as a whole.

At the end of the chapter, we present comparisons between LGB members in the active and reserve components on the key outcomes presented in this chapter. These comparative results use ARRs based on regression models that control for demographic and military characteristics that are known to differ between the two populations (see Chapter Two for a discussion of these covariates). The ARRs can be interpreted as the multiplicative factor by which the estimate for the reserve component is higher (or lower) than the estimate for the active component. For example, an ARR of 1.2 implies that service members in the reserve component have a prevalence rate that is 20-percent higher than the rate for service members in the active component. Ratios below 1.0 indicate lower prevalence rates for the reserve component. We also present unadjusted RRs to give the reader a sense of how much adjustment for demographic characteristics matters for the comparisons. When interpreting ARRs and percentage changes between populations, it is important to keep in mind the base rate for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

Sexual Orientation

Table 9.1 provides estimates based on the two measures of sexual orientation: activity and identity, by gender. Key findings include the following:

- Among men, 2.8 percent (95-percent CI: 2.3–3.3) had one or more same-sex partners in the past 12 months. Significantly more women, 9.8 percent (95-percent CI: 8.6–11.0), did so.

Table 9.1
Sexual Orientation, by Gender

	Men	Women
Sexual activity		
Had one or more same-sex partners in the past 12 months	2.8%[a] (2.3–3.3)	9.8% (8.6–11.0)
Sexual identity		
Gay or lesbian	1.7%[a] (1.4–2.1)	7.2% (6.2–8.2)
Bisexual	2.0%[a] (1.6–2.5)	8.2% (7.0–9.4)
Total LGB identity	3.8%[a] (3.2–4.4)	15.4% (13.9–16.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

- Women in the reserve component were more likely to be LGB-identified than men, and roughly equal percentages of bisexual and gay or lesbian individuals were serving in the reserve component.
  - Among the 3.8 percent (95-percent CI: 3.2–4.4) of LGB servicemen, 1.7 percent (95-percent CI: 1.4–2.1) identified as gay, and 2.0 percent (95-percent CI: 1.6–2.5) identified as bisexual.
  - Among the 15.4 percent (95-percent CI: 13.9–16.9) of LGB servicewomen, 7.2 percent (95-percent CI: 6.2–8.2) identified as gay or lesbian, and 8.2 percent (95-percent CI: 7.0–9.4) identified as bisexual.

Tables 9.2 and 9.3 show the percentages of reserve component members who identified as LGB overall and by reserve component and pay grade, respectively. Key findings include the following:

- In 2018, 6.1 percent (95-percent CI: 5.6–6.7) of reserve component members identified as LGB (Table 9.2).
- The Navy Reserve (8.0 percent; 95-percent CI: 6.2–9.8) and the Army National Guard (7.1 percent; 95-percent CI: 6.0–8.2) had the highest percentages of service members who identified as LGB (Table 9.2).
- LGB personnel were more likely to be junior enlisted personnel or junior officers, with statistically significant differences observed between junior enlisted members (8.6 percent; 95-percent CI: 7.4–9.9) and all other pay grades (Table 9.3).
- We found no significant differences in the percentage of service members who identified as LGB based on race/ethnicity (Appendix Table D.87).
- Significantly more service members under age 35 (9.1 percent, 95-percent CI: 7.5–10.7, among those ages 17–24 and 6.9 percent, 95-percent CI: 5.9–7.8, among those ages 25–34) self-identified as LGB compared with those age 35 or older (3.6 percent, 95-percent CI: 3.1–4.1, among those aged 35–44 and 2.5 percent, 95-percent CI: 2.1–3.0, among those 45 or older; Appendix Table D.88).

Table 9.2
LGB Identity, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
LGB	4.7%[d,f] (3.7–5.7)	3.8%[c,d,f] (3.1–4.6)	6.1%[b] (5.0–7.3)	7.1%[a,b] (6.0–8.2)	4.1% (1.7–6.5)	8.0%[a,b] (6.2–9.8)	3.6% (1.3–5.8)	5.9% (5.2–6.7)	6.3% (5.5–7.2)	6.1% (5.6–6.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[f] Statistically significantly different from Navy Reserve estimate.

Table 9.3
LGB Identity, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
LGB	8.6%[b,c,d,e,f] (7.4–9.9)	5.3%[a,c,f] (4.6–6.1)	2.6%[a,b,e] (2.1–3.1)	3.5%[a] (1.5–5.5)	4.3%[a,c] (3.2–5.4)	3.0%[a,b] (2.3–3.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

LGB Health Promotion and Disease Prevention

Table 9.4 indicates the percentages of LGB and non-LGB reserve personnel for six key health promotion measures. We found that:

- Among LGB personnel, 67.0 percent (95-percent CI: 62.3–71.8) had a routine checkup in the past 12 months, which was significantly lower than the percentage among non-LGB service members (71.9 percent; 95-percent CI: 70.7–73.1).
- Fewer LGB service members, 54.6 percent (95-percent CI: 49.8–59.4), had BMI scores that classified them as overweight or obese relative to non-LGB service members (66.1 percent, 95-percent CI: 64.9–67.3).
- The percentages of LGB service members who engaged in recommended levels of moderate (62.9 percent; 95-percent CI: 58.1–67.7) and vigorous (39.3 percent; 95-percent CI:

Table 9.4
Health Promotion and Disease Prevention, by LGB Identity

	LGB	Non-LGB
Routine checkup, past 12 months	67.0%[a] (62.3–71.8)	71.9% (70.7–73.1)
Overweight or obese	54.6%[a] (49.8–59.4)	66.1% (64.9–67.3)
150+ mins/week MPA, past 30 days[z]	62.9% (58.1–67.7)	67.5% (66.4–68.6)
75+ mins/week VPA, past 30 days[z]	39.3% (34.6–44.1)	41.8% (40.5–43.0)
7+ hours of sleep per 24-hour period, past 30 days[z]	42.1% (37.3–46.8)	45.6% (44.4–46.8)
Good or fairly good sleep quality, past 30 days	68.8%[a] (64.4–73.2)	75.2% (74.1–76.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-LGB estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

34.6–44.1) physical activity each week were similar to the percentages of non-LGB personnel who did so.
- Our estimate of the percentage of LGB personnel who got sufficient sleep (on average, seven or more hours per night) was 42.1 percent (95-percent CI: 37.3–46.8). This was not statistically different from the percentage among other personnel (45.6 percent; 95-percent CI: 44.4–46.8).
- However, significantly fewer LGB reserve component personnel described the quality of their sleep as fairly good or good (68.8 percent; 95-percent CI: 64.4–73.2) than did non-LGB personnel (75.2 percent; 95-percent CI: 74.1–76.2).

LGB Substance Use

We examined binge and heavy drinking, tobacco use, and use of any illegal drug by LGB identity. We also examine use of prescription pain relievers in this section. Though legal, the prescribed use of these substances for prolonged periods is a risk factor for later misuse and abuse. Results are reported in Table 9.5. All forms of substance use except use of smokeless tobacco were significantly more common among LGB service members compared with non-LGB service members, although the extent of disparities varied by the particular substance examined. Use of smokeless tobacco was significantly less common among LGB personnel compared with their non-LGB counterparts. Key findings related to substance use include the following:

- Among LGB personnel, 37.5 percent (95-percent CI: 32.7–42.2) reported binge drinking in the past month, and 12.0 percent (95-percent CI: 8.4–15.6) reported heavy drinking. The percentages among non-LGB personnel were lower for both measures (binge drink-

Table 9.5
Substance Use, by LGB Identity

	LGB	Non-LGB
Binge drinking, past 30 days	37.5%[a] (32.7–42.2)	28.4% (27.3–29.5)
Heavy drinking, past 30 days	12.0%[a] (8.4–15.6)	7.1% (6.5–7.8)
Cigarette smoking, past 30 days	21.5%[a] (16.9–26.1)	12.8% (11.9–13.7)
E-cigarette use, past 30 days	19.2%[a] (15.0–23.4)	9.3% (8.5–10.1)
Smokeless tobacco use, past 30 days	5.6%[a] (3.0–8.2)	11.3% (10.5–12.2)
Any drug use, past 12 months	9.3%[a] (5.9–12.6)	2.3% (1.8–2.8)
Used prescription pain relievers, past 12 months	11.0%[a] (8.0–14.1)	8.1% (7.5–8.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-LGB estimate.

ing, 28.4 percent, 95-percent CI: 27.3–29.5; heavy drinking, 7.1 percent, 95-percent CI: 6.5–7.8).
- We found substantial differences in rates of current (past-30-day) smoking among LGB versus non-LGB personnel. LGB personnel were almost twice as likely to smoke as their non-LGB counterparts: 21.5 percent (95-percent CI: 16.9–26.1) versus 12.8 percent (95-percent CI: 11.9–13.7).
- Roughly one in five LGB service members (19.2 percent; 95-percent CI: 15.0–23.4) reported use of e-cigarettes in the past 30 days, more than double the percentage of non-LGB members who used e-cigarettes (9.3 percent; 95-percent CI: 8.5–10.1).
- LGB service members were about half as less likely to use smokeless tobacco as non-LGB personnel: 5.6 percent (95-percent CI: 3.0–8.2) versus 11.3 percent (95-percent CI: 10.5–12.2).
- Nearly one in ten LGB service members (9.3 percent; 95-percent CI: 5.9–12.6) reported past-year drug use. This was four times the percentage among other reserve component personnel (2.3 percent; 95-percent CI: 1.8–2.8).
- A smaller but significant difference was also detected in the percentages of LGB and non-LGB service members using prescription pain relievers in the past year: 11.0 percent (95-percent CI: 8.0–14.1) in the LGB group versus 8.1 percent (95-percent CI: 7.5–8.7) in the non-LGB group.

LGB Mental Health and Mental Health Services Use

A variety of mental health indicators were included in the 2018 HRBS, as well as indicators of mental health service use. We focused on the most central of them for this chapter. Results are reported in Table 9.6. All of the mental and emotional health problems examined were significantly more common among LGB reserve component service members compared with non-LGB personnel, although it is important to note that, overall, a minority of LGB personnel experienced difficulties with their mental health. Key findings include the following:

- There were substantial differences in experiences of psychological distress between LGB and non-LGB service members. Nearly one in four LGB service members (23.7 percent; 95-percent CI: 19.3–28.1) reported psychological distress levels indicative of serious distress, more than twice the percentage of non-LGB service members (9.9 percent; 95-percent CI: 9.1–10.7).
- Symptoms of probable PTSD were experienced by one in seven LGB service members (17.7 percent; 95-percent CI: 13.8–21.6). This was statistically significantly higher than the percentage of non-LGB personnel experiencing such symptoms (10.0 percent; 95-percent CI: 9.3–10.6).
- Past-year suicidal thoughts were reported by more than three times as many LGB as non-LGB service members (17.7 percent, 95-percent CI: 13.6–21.8 versus 5.2 percent, 95-percent CI: 4.6–5.8); past-year suicide attempts were three times as common among LGB personnel (2.4 percent, 95-percent CI: 0.4–4.4 versus 0.8 percent, 95-percent CI: 0.5–1.1).

Table 9.6
Mental and Emotional Health and Mental Health Services Use, by LGB Identity

	LGB	Non-LGB
Serious psychological distress, past 12 months	23.7%[a] (19.3–28.1)	9.9% (9.1–10.7)
Probable PTSD	17.7%[a] (13.8–21.6)	10.0% (9.3–10.6)
Suicidal thoughts, past 12 months	17.7%[a] (13.6–21.8)	5.2% (4.6–5.8)
Suicide attempt, past 12 months	2.4%[a] (0.4–4.4)	0.8% (0.5–1.1)
Any angry or aggressive behavior, past 30 days	52.7%[a] (47.9–57.5)	46.5% (45.3–47.7)
Any mental health service use, past 12 months	36.9%[a] (32.1–41.7)	20.0% (19.0–20.9)
Saw mental health care specialist, past 12 months	26.0%[a] (21.5–30.5)	12.7% (11.9–13.4)
Saw general medical provider for a mental health problem, past 12 months	23.6%[a] (19.1–28.1)	11.9% (11.2–12.7)
Used medication for a mental health problem, past 12 months	16.1%[a] (12.0–20.3)	7.7% (7.1–8.2)
Perceived unmet need for mental health services, past 12 months	10.8%[a] (7.6–14.1)	4.1% (3.7–4.6)
Believe mental health treatment would damage military career	39.0%[a] (34.2–43.7)	29.3% (28.2–30.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-LGB estimate.

- LGB service members were more likely to report angry or aggressive behavior in the past 30 days than were non-LGB personnel (52.7 percent, 95-percent CI: 47.9–57.5 versus 46.5 percent, 95-percent CI: 45.3–47.7).
- Use of all forms of mental health services tested, including visiting a mental health care specialist (26.0 percent; 95-percent CI: 21.5–30.5), visiting a general medical doctor for mental health issues (23.6 percent; 95-percent CI: 19.1–28.1), and use of medication (16.1 percent; 95-percent CI: 12.0–20.3), was more common among LGB service members than among non-LGB members. In the non-LGB group, the percentage visiting a specialist was 12.7 (95-percent CI: 11.9–13.4); the percentage visiting a general medical provider was 11.9 (95-percent CI: 11.2–12.7); and the percentage using medication was 7.7 (95-percent CI: 7.1–8.2).
- Despite greater mental health service utilization, LGB personnel more often reported unmet need for mental health services in the past 12 months (10.8 percent, 95-percent CI: 7.6–14.1 versus 4.1 percent, 95-percent CI: 3.7–4.6) and were more likely to believe that use of mental health care was stigmatizing (39.0 percent, 95-percent CI: 34.2–43.7 versus 29.3 percent, 95-percent CI: 28.2–30.4) than were non-LGB personnel.

LGB Physical Health

Table 9.7 indicates the percentages of LGB service members who reported each of a variety of physical health problems, as well as percentages among non-LGB personnel.

- There were no statistically significant differences in reports of any of the physical health problems examined (high blood pressure, diabetes, high cholesterol, asthma, back pain, musculoskeletal injury) by LGB identity except asthma, which was more than twice as common among LGB as non-LGB personnel: 4.4 percent (95-percent CI: 2.4–6.5) versus 1.8 percent (95-percent CI: 1.5–2.1).

LGB Unwanted Sexual Contact and Physical Abuse

In the general U.S. population, LGB individuals are more likely to experience sexual and physical abuse (Katz-Wise and Hyde, 2012; Walters et al., 2013). This is also the case among members of the reserve component. Key findings related to unwanted sexual contact and physical abuse are presented in Table 9.8 and include the following:

- Since joining the military, 22.7 percent (95-percent CI: 18.7–26.8) of LGB service members had experienced unwanted sexual contact, and 7.2 percent (95-percent CI: 4.2–10.2) responded that they had had such an experience within the past 12 months. These percentages are about three and six times higher, respectively, than the percentages observed among other personnel.
- Approximately one in 14 LGB service members had experienced physical assault since joining the military (7.2 percent; 95-percent CI: 4.5–10.0), and 1.8 percent (95-percent

Table 9.7
Physical Health, by LGB Identity

	LGB	Non-LGB
Physician-diagnosed chronic conditions		
High blood pressure[z]	6.7% (4.2–9.2)	9.4% (8.8–10.0)
Diabetes[z]	1.0% (0.0–2.2)	1.2% (1.0–1.4)
High cholesterol[z]	5.6% (3.7–7.5)	6.9% (6.4–7.3)
Asthma	4.4%[a] (2.4–6.5)	1.8% (1.5–2.1)
Pain and injury		
Back pain[z]	21.0% (17.0–25.0)	21.7% (20.7–22.6)
Bone, joint, or muscle injury (including arthritis)[z]	23.9% (19.7–28.1)	21.8% (20.9–22.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-LGB estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table 9.8
Unwanted Sexual Contact and Physical Abuse, by LGB Identity

	LGB	Non-LGB
Unwanted sexual contact since joining the military	22.7%[a] (18.7–26.8)	6.8% (6.3–7.3)
Unwanted sexual contact, past 12 months	7.2%[a] (4.2–10.2)	1.2% (0.9–1.5)
Physically assaulted since joining the military	7.2%[a] (4.5–10.0)	3.6% (3.2–4.0)
Physically assaulted, past 12 months	1.8%[a] (0.2–3.5)	0.6% (0.4–0.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. For unwanted sexual contact, the exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[a] Statistically significantly different from non-LGB estimate.

CI: 0.2–3.5) had experienced a physical assault in the past 12 months. Among non-LGB personnel, percentages were significantly lower: 3.6 percent (95-percent CI: 3.2–4.0) indicated that they had experienced any assault since joining the military, and 0.6 percent (95-percent CI: 0.4–0.8) indicated experiencing any assault in the past 12 months.

LGB Sexual and Reproductive Health

Sexual and reproductive health are influenced by key behaviors, such as numbers of sexual partners and use of condoms and other contraception. We examined how these indicators varied by LGB status and examined important outcomes for individual health and readiness. The latter included diagnosis of STI, regular testing for HIV infection, and unintended pregnancy. Key findings related to sexual and reproductive health are presented in Table 9.9 and include the following:

- Across all services, 33.5 percent (95-percent CI: 28.8–38.3) of LGB reserve component service members had more than one sexual partner in the past year, and 39.4 percent (95-percent CI: 34.6–44.2) had unprotected vaginal or anal sex with a new sex partner in the past year. The percentages were significantly lower among non-LGB personnel (14.7 percent, 95-percent CI: 13.7–15.7, and 32.7 percent, 95-percent CI: 31.6–33.9, respectively).
- Consistent with these risk behaviors, 6.2 percent (95-percent CI: 3.9–8.5) of LGB personnel had an STI in the past year, which was significantly higher than the 1.6 percent (95-percent CI: 1.3–1.8) among the rest of the service.
- LGB reserve component service members were more likely to have had an HIV test in the past six months than were other service members (45.5 percent, 95-percent CI: 40.7–50.3, versus 38.0 percent, 95-percent CI: 36.8–39.2). Among LGB service members, 73.9 per-

Table 9.9
Sexual and Reproductive Health, by LGB Identity

	LGB	Non-LGB
New partner without condom use, past 12 months	39.4%[a] (34.6–44.2)	32.7% (31.6–33.9)
2+ sex partners, past 12 months	33.5%[a] (28.8–38.3)	14.7% (13.7–15.7)
Sexual transmitted infection, past 12 months	6.2%[a] (3.9–8.5)	1.6% (1.3–1.8)
HIV test, past 6 months	45.5%[a] (40.7–50.3)	38.0% (36.8–39.2)
HIV test, past 12 months[z]	73.9% (69.6–78.2)	71.2% (70.0–72.4)
No birth control use at most-recent vaginal sex (among those who have had vaginal sex), past 12 months[z]	21.5% (18.0–25.0)	19.0% (18.0–19.9)
Unintended pregnancy, past 12 months[z]	1.8% (0.7–3.0)	2.5% (2.1–2.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-LGB estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

cent (95-percent CI: 69.6–78.2) had an HIV test in the past year. This percentage was not statistically significantly different from non-LGB personnel (71.2 percent; 95-percent CI: 70.0–72.4).

- Among LGB reserve personnel who had vaginal sex in the past year, 21.5 percent (95-percent CI: 18.0–25.0) did not use any form of birth control during their most-recent vaginal sex, while the rate was 19.0 percent (95-percent CI: 18.0–19.9) among other reserve component service members. This difference was not significant.
- Among LGB reserve component service members, 1.8 percent (95-percent CI: 0.7–3.0) caused or experienced an unintended pregnancy in the past 12 months, which was not significantly different from the percentage among non-LGB reserve members (2.5 percent; 95-percent CI: 2.1–2.9).

Comparisons with the 2018 HRBS Active Component Sample

Comparisons of LGB members of the reserve component with LGB members of the active component are reported in Table 9.10, both unadjusted and adjusted for differences in the background characteristics of these two groups. Because these populations are relatively small, CIs are wide for many of these estimates. The reader should keep this in mind in interpreting both prevalence estimates and statistical tests for differences. RRs do not control for any demographic characteristics of respondents; ARRs are based on regression models that do control for demographic characteristics of respondents (i.e., service branch, pay grade, gender, marital status, age at time of survey, age squared, racial/ethnic minority status, education level, AFQT percentile [missing if officer], DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade).

Table 9.10
Rates of Selected Health Behaviors and Outcomes for LGB Service Members in the Reserve Component Relative to LGB Service Members in the Active Component, Unadjusted and Adjusted for Service Member Characteristics

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Health promotion and disease prevention		
Routine checkup, past 12 months	0.99 (0.90, 1.09)	0.98 (0.88, 1.09)
Overweight or obese	1.01 (0.90, 1.14)	0.99 (0.87, 1.12)
150+ mins/week moderate to vigorous physical activity, past 30 days	0.87*** (0.79, 0.95)	0.83*** (0.75, 0.91)
75+ mins/week moderate to vigorous physical activity, past 30 days	0.87* (0.75, 1.02)	0.81** (0.68, 0.96)
7+ hours of sleep per 24-hour period, past 30 days	1.41*** (1.19, 1.67)	1.47*** (1.20, 1.78)
Good or fairly good sleep quality, past 30 days	1.23*** (1.11, 1.36)	1.25*** (1.11, 1.40)
Substance use		
Binge drinking, past 30 days	0.96 (0.81, 1.13)	1.06 (0.88, 1.28)
Heavy drinking, past 30 days	0.87 (0.60, 1.25)	0.87 (0.59, 1.30)
Cigarette smoking, past 30 days	1.02 (0.78, 1.33)	0.88 (0.65, 1.20)
E-cigarette use, past 30 days	0.78* (0.60, 1.03)	1.01 (0.75, 1.36)
Smokeless tobacco use, past 30 days	0.97 (0.54, 1.72)	1.06 (0.58, 1.93)
Any drug use, past 12 months	2.96*** (1.58, 5.56)	2.42*** (1.27, 4.60)
Used prescription pain relievers, past 12 months	0.75 (0.53, 1.06)	0.74* (0.53, 1.06)
Mental and emotional health and mental health services use		
Serious psychological distress, past 12 months	0.78** (0.62, 0.98)	0.81 (0.63, 1.05)
Probable PTSD	1.07 (0.80, 1.42)	0.95 (0.70, 1.29)
Suicidal thoughts, past 12 months	1.12 (0.82, 1.53)	1.14 (0.81, 1.59)
Any angry or aggressive behavior, past 30 days	0.97 (0.86, 1.09)	1.00 (0,87, 1.14)
Any mental health service use, past 12 months	1.03 (0.87, 1.23)	0.93 (0.77, 1.13)

Table 9.10—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
Saw mental health care specialist, past 12 months	0.85 (0.69, 1.06)	0.76** (0.60, 0.96)
Saw general medical provider for a mental health problem, past 12 months	1.21 (0.93, 1.56)	0.96 (0.73, 1.26)
Used medication for a mental health problem, past 12 months	1.24 (0.90, 1.69)	1.02 (0.77, 1.36)
Perceived unmet need for mental health services, past 12 months	0.78 (0.54, 1.14)	0.70* (0.47, 1.03)
Believe mental health treatment would damage military career	0.85** (0.73, 1.00)	0.93 (0.78, 1.10)
Physician-diagnosed chronic conditions		
High blood pressure	0.94 (0.59, 1.49)	0.75 (0.45, 1.24)
Diabetes	1.67 (0.42, 6.59)	1.15 (0.23, 5.80)
High cholesterol	1.68 (0.87, 3.27)	1.19 (0.63, 2.23)
Asthma	2.48*** (1.26, 4.88)	1.76 (0.75, 4.15)
Pain and injury		
Back pain	0.94 (0.74, 1.20)	0.69*** (0.54, 0.88)
Bone, joint, or muscle injury (including arthritis)	1.00 (0.79, 1.26)	0.72*** (0.56, 0.92)
Unwanted sexual contact and physical abuse		
Unwanted sexual contact since joining the military	0.77** (0.62, 0.96)	0.77** (0.60, 1.00)
Unwanted sexual contact, past 12 months	0.66 (0.41, 1.08)	0.62* (0.37, 1.05)
Physically assaulted since joining the military	0.88 (0.54, 1.44)	0.85 (0.51,1.42)
Sexual and reproductive health		
New partner without condom use, past 12 months	0.91 (0.77, 1.06)	0.88 (0.74, 1.06)
2+ sex partners, past 12 months	0.80** (0.67, 0.96)	0.76*** (0.62, 0.92)
STI, past 12 months	0.61* (0.37, 1.00)	0.50** (0.27, 0.91)
HIV test, past 6 months	1.06 (0.91, 1.22)	1.04 (0.88, 1.23)

Table 9.10—continued

	Risk Ratio (Upper Bound, Lower Bound)	Adjusted Risk Ratio (Upper Bound, Lower Bound)
HIV test, past 12 months	0.95 (0.88, 1.02)	0.93* (0.85, 1.01)
No birth control use at most-recent vaginal sex, past 12 months	1.12 (0.89, 1.41)	1.08 (0.86, 1.35)

NOTES: RRs and ARRs above 1.0 indicate that the reserve component had an increased prevalence of the outcome in question compared with the active component; RRs and ARRs below 1.0 indicate that the reserve component had a decreased prevalence of the outcome in question compared with the active component. Models do not use weights, but ARRs control for service branch, pay grade (officer, enlisted, warrant officer), gender, marital status (married versus not), age (at time of survey), age squared, racial/ethnic minority status, education level, AFQT percentile (missing if officer), DoD occupation code, missing flags for race/ethnicity and education level, and an interaction between service branch and pay grade. Because the LGB subpopulation is relatively small, all models use the "low prevalence" models collapsing warrant officers and officers into a single group, collapsing DoD occupation code into combat versus noncombat codes, and dropping the interaction between service branch and pay grade and the missing flags for both education level and minority status. Three outcomes could not be modeled due to small sample sizes and low prevalence: suicide attempt in past 12 months, physically assaulted in past 12 months, and unintended pregnancy in past 12 months. For unwanted sexual contact, the exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Health Promotion and Disease Prevention

- LGB reserve component service members reported statistically significantly lower levels of physical activity in both the unadjusted (RR for 150+ mins/week = 0.87, CI: 0.79–0.95; RR for 75+ mins/week = 0.87, CI: 0.75–1.02) and adjusted (ARR for 150+ mins/week = 0.83, CI: 0.75–0.91; ARR for 75+ mins/week = 0.81, CI: 0.68–0.96) models than LGB active component service members. In the adjusted models, LGB reserve component service members had a 17–19-percent lower rate of engaging in recommended minutes of MPA or VPA in the past 30 days.
- LGB reserve component service members reported statistically significantly higher rates of sufficient sleep and good or fairly good sleep quality in the past 30 days than LGB active component service members in both the unadjusted (RR for sufficient sleep = 1.41, CI: 1.19–1.67; RR for good/fairly good quality = 1.23, CI: 1.11–1.36) and adjusted (ARR for sufficient sleep = 1.47, CI: 1.20–1.78; ARR for good/fairly good quality = 1.25, CI: 1.11–1.40) models. In the adjusted models, LGB reserve component service members had a nearly 50-percent higher rate of sleep sufficiency and a 25-percent higher rate of good or fairly good sleep quality in the past 30 days.
- Differences between the LGB reserve component and the LGB active component in the prevalence of routine checkups in the past 12 months and in overweight or obesity were not statistically significant.

Substance Use

- LGB reserve component service members were statistically significantly more likely to engage in drug use in the past year as compared with LGB active component service members (RR = 2.96, CI: 1.58–5.56; ARR = 2.42, CI: 1.27–4.60). In the adjusted model, LGB reserve component service members reported over 240 percent as much drug use as LGB active component service members over the year prior to the survey. Note, however, that illicit substance use was a very low-prevalence outcome, so a two-and-a-half-fold increase does not represent a large proportion of LGB reserve component service members.
- In the unadjusted model, marginally significant lower rates of e-cigarette use were observed in the LGB reserve component compared with the LGB active component (RR = 0.78, CI: 0.60–1.03); however, these differences were not statistically significant in the adjusted model.
- Marginally significant differences were observed between the reserve component and the active component in LGB individuals' use of prescription pain relievers in the past 12 months in the adjusted model (ARR = 0.74, CI: 0.53, 1.06). The trend was such that LGB reserve component service members used these less often than LGB members of the active component.
- No statistically significant differences between LGB members of the reserve and active components were observed for binge drinking, heavy drinking, cigarette smoking, or smokeless tobacco use in the past 30 days.

LGB Mental Health and Mental Health Services Use

- In the adjusted model, LGB members of the reserve component were less likely than LGB members of the active component to have seen a mental health specialist in the past 12 months (ARR = 0.76, CI: 0.60–0.96). No statistically significant difference was observed between the reserve and the active component in the unadjusted model for this outcome.
- LGB members of the reserve component were 22 percent less likely to have experienced serious psychological distress in the past 12 months than LGB members of the active component in the unadjusted model (RR = 0.78, CI: 0.62–0.98), but this difference was not statistically significant after adjustment.
- Similarly, LGB members of the reserve component were 15 percent less likely to believe that mental health treatment would harm their careers than were LGB members of the active component (RR = 0.85, CI: 0.73–1.00), but this difference was not statistically significant in the adjusted model.
- A marginally significant difference in perceived unmet need for mental health services was observed in the adjusted model only (ARR = 0.70, CI: 0.47–1.03). The trend was such that LGB members of the reserve component were less likely to report an unmet need for mental health care.
- No significant differences were observed for other indicators of mental and emotional health or use of mental health services (see Table 9.10).

Physical Health

- In the adjusted models, LGB members of the reserve component were 31 percent less likely than LGB members of the active component to report back pain (ARR = 0.69, CI: 0.54–0.88) and 28 percent less likely to report a bone, joint, or muscle injury (ARR = 0.72, CI: 0.56–0.92). No statistically significant differences were observed between the reserve and the active components in the unadjusted models for these outcomes.
- Statistically significant differences in the prevalence of physician-diagnosed asthma were observed in the unadjusted model. LGB members of the reserve component were nearly two-and-one-half times as likely to report a diagnosis of asthma as their LGB counterparts in the active component (RR = 2.48, CI: 1.26–4.88). This difference was not statistically significant after adjustment for other differences between LGB members in the reserve and active components, however.
- No other statistically significant differences were observed between LGB members of the active and reserve component for other physician-diagnosed conditions: high blood pressure, diabetes, or high cholesterol.

Unwanted Sexual Contact and Physical Abuse

- LGB reserve component members were 23 percent less likely than LGB members of the active component to indicate that they had experienced unwanted sexual contact since joining the military in both unadjusted (RR = 0.77, CI: 0.62–0.96) and adjusted (ARR = 0.77, CI: 0.60–1.00) models.
- There was also a marginally significant trend toward lower rates of unwanted sexual contact in the past 12 months among LGB members of the reserve versus the active component, but only in the adjusted model (ARR = 0.62, CI: 0.37–1.05).
- No statistical differences in responses about physical assaults since joining the military were observed between LGB reserve and active component service members.[1]

LGB Sexual and Reproductive Health

- In the adjusted models, LGB members of the reserve component were 24 percent less likely than LGB members of the active component to report having two or more sex partners in the past 12 months (ARR = 0.76, CI: 0.62–0.92) and 50 percent less likely to have been diagnosed with an STI in the same period (ARR = 0.50, CI: 0.27–0.91). These differences were marginally significant in the unadjusted models (2+ sex partners RR = 0.80, CI: 0.67–0.96; STI RR = 0.61, CI: 0.37–1.00). There was a marginally significant trend toward lower rates of HIV testing in the past 12 months among LBG members of the reserve component than among their active component counterparts in the adjusted model (ARR = 0.93, CI: 0.85–1.01). No statistically significant difference was observed for this outcome in the unadjusted model.

[1] The model for physical assault in the past 12 months would not converge even after trimming the number of covariates. This was likely due to the low prevalence rates in the reserve component.

- No significant differences were observed between LGB members serving in the reserve and active components in rates of sex with a new partner without the use of a condom, HIV testing in the past six months, or sex without birth control in the past 12 months.

Summary

LGB personnel make up just over 6 percent of service members in the reserve component and have unique health-related issues. Although these individuals are a small portion of the force, the disparities in their experiences, behaviors, and outcomes warrant close attention and tracking by DoD so that their specific needs can be addressed.

LGB personnel are similar to non-LGB personnel in rarely experiencing chronic health problems, although LGB personnel were substantially more likely than their non-LGB counterparts to report a diagnosis of asthma. Although we cannot be sure of the reason for this, it could be related to the considerably higher rates of smoking among LGB versus non-LGB reserve component service members. Levels of physical activity and rates of obtaining sufficient hours of sleep per night were also similar among LGB and non-LGB service members. LGB service members fared better than non-LGB members in one aspect of health promotion: LGB reserve component personnel were less likely than non-LGB personnel to be overweight or obese. And they fared worse in another respect: Compared with non-LGB personnel, their perceived sleep quality was worse. This could be a function of some of the other health behaviors and outcomes that LGB reserve component personnel reported, which can be associated with poor quality sleep. More LGB service members reported drug use, use of prescription pain relievers, binge drinking, and heavy drinking than did non-LGB service members. Rates of cigarette and e-cigarette use were approximately double among LGB versus non-LGB reserve personnel. Across the substances studied, only the percentage of service members using smokeless tobacco was lower among LGB versus non-LGB service members.

Substantially more LGB service members had mental health problems—rates of serious distress, suicidal thoughts, and suicide attempts were two to three or more times higher among LGB personnel than others. Almost one-quarter of LGB reserve component service members reported serious psychological distress, and rates of PTSD were also substantially elevated in the LGB subpopulation compared with their non-LGB counterparts. LGB personnel were approximately two times more likely to use all mental health services than their non-LGB peers. Yet perceived unmet mental health needs were still more than twice as common among LGB service members, with about one-tenth reporting that they needed help with mental health issues in 2018 and did not get it. Perhaps as a result of the dual stigma of mental health issues and LGB status, LGB service members were also more likely to believe that using mental health services would harm their career than were their non-LGB counterparts. Just under 40 percent of LGB personnel endorsed this idea. Given the substantial mental health burden among LGB personnel, unmet need for mental health treatment and the potential role of stigma in this unmet need take on particular significance.

As previously noted, elevated mental health and substance use issues among LGB individuals are also found in the civilian population. These disparities are thought to be a result of minority stress (Hatzenbuehler and Link, 2014), which is the difficulty of being a member of a marginalized social group (Meyer, 2003). While a variety of factors contribute to minority stress, these factors include bullying and violence. Just over 20 percent of LGB service members

responded that they had been the victim of unwanted sexual contact, and 7 percent responded that they had been the victim of physical assault since joining the military, indicating a stressful environment for these LGB personnel.

Regarding sexual health, a greater percentage of LGB service members than others engaged in sexual behavior that poses a risk to health and might result in unintended pregnancy. In line with this, just over 6 percent of LGB personnel had experienced an STI in the year prior to the survey. However, LGB service members used birth control (when they had vaginal sex) at rates similar to non-LGB personnel and, possibly as a result, were no more likely to experience an unintended pregnancy than their non-LGB counterparts. LGB members of the reserve component were also more likely to have had an HIV test in the past six months, compared with non-LGB service members.

Although experiencing some significant health challenges, LGB members of the reserve component were somewhat healthier than LGB individuals serving in the active component. They reported more-sufficient and better-quality sleep, less back pain, and fewer musculoskeletal injuries; were less likely to have been subjected to unwanted sexual contact since joining the military; and were less likely to have had two or more sex partners or to have been diagnosed with an STI in the past 12 months. LGB reserve component members fared worse than LGB members in the active component on only three of the indicators examined: They were less likely to have engaged in recommended levels of MPA or VPA in the past 30 days, and they were more likely to have used illicit drugs during that period. Differences, either positive or negative, between LGB service members in the reserve and active components were, however, fairly uncommon. We failed to detect a statistically significant difference for the vast majority of measures examined.

In considering these results, it is important to keep in mind that LGB reserve component service members are a heterogeneous group. Almost half of LGB personnel identify as bisexual. This is in line with estimates for the general population (Copen, Chandra, and Febo-Vazquez, 2016). Bisexual "invisibility" (Taylor, 2018) is thought to pose an additional source of stress; acknowledging bisexuality in policy and dialogue around LGB issues in the military could be important in reducing LGB disparities overall. Finally, more than one in seven women serving in the reserve component identify as LGB. Addressing the needs of LGB individuals is thus integral to addressing the health of female reserve component service members.

CHAPTER TEN

Deployment Experiences and Health

This chapter presents the results of reserve component service members' experiences with deployment, both combat and noncombat, and health and health-related behaviors. Specifically, this chapter presents descriptive statistics about the frequency and duration of deployments, as well as select analyses of substance use, mental and emotional health, and physical health by deployment history.

Each section highlights the importance of deployment-related analyses for the military community. Key measures used are described in the applicable section, and additional details about these measures can be found in Appendix C. Recent and lifetime deployment demographics are presented by service branch, pay grade, and gender, while analyses by race/ethnicity and age group are available in Appendix D. Additional analyses stratify the sample by recent deployment. All analyses demonstrated statistically significant omnibus tests (Rao-Scott chi-square test for categorical variables and F-tests for continuous variables), unless otherwise noted in the tables. Statistically significant group differences (pairwise comparisons) are also presented. However, only statistically significant differences that the research team's subject-matter experts determined to be substantively meaningful (i.e., those that could be used to change or develop policy or that contribute to inequalities in health outcomes across subgroups) are discussed in the text.

Frequency and Duration of Combat and Noncombat Deployments

The 2018 HRBS included several deployment-related items that ascertained both the number of and amount of time that service members spent in deployment. We were able to assess both lifetime and recent (i.e., past-12-month) deployments. In addition, a single item asks respondents to indicate how many combat deployments they have experienced in their military career. A combat deployment was defined as a deployment on which the service member received imminent danger pay (IDP), hazardous duty pay, and/or combat zone tax exclusion benefits.

Lifetime Number of Deployments

Tables 10.1 through 10.3 present the number of lifetime deployments among reserve component members across all services, by pay grade, and by gender. Key findings related to total cumulative deployments include the following:

Table 10.1
Lifetime Number of Deployments, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
1 time	20.3% (18.1–22.6)	18.4%[c] (16.7–20.2)	23.9%[b,e] (21.9–25.8)	21.8% (20.2–23.4)	15.0%[c] (11.0–19.1)	20.1% (17.2–23.0)	19.0% (13.6–24.4)	21.6% (20.3–22.9)	21.0% (19.7–22.3)	21.3% (20.3–22.2)
2 times	13.1% (11.3–14.9)	14.0% (12.4–15.5)	13.3% (11.9–14.6)	12.1%[f] (11.1–13.2)	10.6% (7.4–13.9)	17.1%[d] (14.5–19.7)	11.7% (7.7–15.6)	13.6% (12.6–14.5)	12.6% (11.7–13.5)	13.0% (12.4–13.7)
3 or more times	25.5%[b,c,d,e,f] (23.2–27.7)	34.7%[a,c,d,e] (32.8–36.7)	15.1%[a,b,d,f,g] (13.7–16.4)	12.2%[a,b,c,f,g] (11.2–13.2)	11.2%[a,b,f,g] (8.7–13.8)	33.6%[a,c,d,e] (30.4–36.9)	31.9%[c,d,e] (25.8–38.0)	19.9% (18.9–21.0)	17.6% (16.6–18.5)	18.6% (17.9–19.3)
I have never been deployed	41.1%[b,c,d,e,f] (38.3–43.9)	32.9%[a,c,d,e] (30.8–34.9)	47.8%[a,b,d,e,f] (45.3–50.2)	53.8%[a,b,c,e,f,g] (51.8–55.9)	63.1%[a,b,c,d,f,g] (57.7–68.6)	29.2%[a,c,d,e] (25.2–33.1)	37.5%[d,e] (30.1–44.9)	44.9% (43.3–46.6)	48.8% (47.1–50.5)	47.1% (45.9–48.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 10.2
Lifetime Number of Deployments, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
1 time	15.6%[b,d,e,f] (14.0–17.3)	29.0%[a,c,f] (27.3–30.7)	18.2%[b,e] (16.7–19.6)	22.9%[a] (18.0–27.8)	27.3%[a,c,f] (24.4–30.2)	19.3%[a,b,e] (17.7–20.9)
2 times	3.2%[b,c,d,e,f] (2.5–3.9)	20.1%[a,d,e] (18.7–21.6)	22.7%[a,e] (21.1–24.3)	29.8%[a,b,e,f] (24.2–35.4)	13.3%[a,b,c,d,f] (11.4–15.3)	21.3%[a,d,e] (19.6–23.0)
3 or more times	2.0%[b,c,d,e,f] (1.5–2.5)	23.4%[a,c,d,e,f] (21.9–24.9)	47.9%[a,b,e] (46.0–49.8)	39.2%[a,b,e,f] (33.6–44.8)	16.5%[a,b,c,d,f] (14.3–18.8)	48.5%[a,b,d,e] (46.4–50.6)
I have never been deployed	79.1%[b,c,d,e,f] (77.3–80.9)	27.5%[a,c,d,e,f] (25.8–29.1)	11.2%[a,b,e] (10.1–12.3)	8.1%[a,b,e] (4.7–11.5)	42.9%[a,b,c,d,f] (39.6–46.2)	10.9%[a,b,e] (9.6–12.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 10.3
Lifetime Number of Deployments, by Gender

	Men	Women
1 time	21.4% (20.3–22.5)	20.9% (19.6–22.3)
2 times	14.0%[a] (13.2–14.8)	9.3% (8.5–10.1)
3 or more times	20.9%[a] (20.0–21.7)	9.9% (9.1–10.7)
I have never been deployed	43.8%[a] (42.3–45.2)	59.9% (58.2–61.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

- Across all services, 52.9 percent of service members had at least one previous deployment (deployed to either a combat or noncombat zone during their service in the military); 47.1 percent (95-percent CI: 45.9–48.3) reported having never deployed (Table 10.1).
- Members of the Air National Guard, the Navy Reserve, and the Coast Guard Reserve were more likely than members of the other services to report three or more previous deployments (Table 10.1).
- Repeated deployments were positively associated with pay grade—that is, higher percentages of senior officers, warrant officers, and senior NCOs reported deploying three or more times during their service in the military compared with lower pay grades (Table 10.2).
- Women were more likely than men to report having never been deployed and less likely than men to report having deployed two or more times (Table 10.3).

Lifetime Number of Combat Deployments

Tables 10.4 through 10.6 present the number of lifetime combat deployments among reserve component members who have ever deployed across all services, by pay grade, and by gender. Key findings related to lifetime number of combat deployments include the following:

- Around one in five (19.7 percent, 95-percent CI: 18.5–20.8) of all reserve component service members who had ever deployed had never been on a combat deployment (Table 10.4). Roughly 42 percent (95-percent CI: 41.0–43.7) had experienced one combat deployment, 22.7 percent (95-percent CI: 21.6–23.7) had experienced two combat deployments, and 15.3 percent (95-percent CI: 14.5–16.2) had experienced three or more lifetime combat deployments.
- Service members in the Coast Guard Reserve were the least likely to have experienced a combat deployment, while service members in the Air Force Reserve, Air National Guard, and Navy Reserve were the most likely to have experienced three or more combat deployments (Table 10.4).
- Junior enlisted service members were the most likely to have never experienced a combat deployment (Table 10.5). Senior enlisted personnel, warrant officers, and senior officers were all more likely to have experienced three or more lifetime combat deployments compared with junior enlisted and junior officers. Results by age mirrored these results, with the youngest service members being most likely to have never experienced a combat deployment (Appendix Table D.92).
- More than one-quarter of women (27.1 percent, 95-percent CI: 24.9–29.3) reported having never experienced a combat deployment, compared with less than one-fifth (18.3 percent, 95-percent CI: 17.0–19.6) of men (Table 10.6).

Table 10.4
Lifetime Number of Combat Zone Deployments, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
I have not had any combat zone deployments	25.9%[c,d,g] (22.8–29.1)	23.8%[c,d,g] (21.6–26.1)	15.5%[a,b,e,f,g] (13.3–17.7)	14.8%[a,b,e,f,g] (12.8–16.9)	27.7%[c,d,g] (19.3–36.1)	27.4%[c,d,g] (23.6–31.2)	67.7%[a,b,c,d,e,f] (60.4–75.0)	22.0% (20.3–23.6)	17.6% (16.1–19.2)	19.7% (18.5–20.8)
1 deployment	33.0%[c,d] (29.8–36.2)	34.1%[c,d] (31.6–36.5)	46.3%[a,b,f,g] (43.6–49.1)	48.9%[a,b,f,g] (46.4–51.4)	37.5% (29.8–45.1)	34.3%[c,d] (30.7–38.0)	25.2%[c,d] (18.5–32.0)	40.1% (38.3–41.9)	44.3% (42.4–46.2)	42.3% (41.0–43.7)
2 deployments	18.9%[c,d,g] (16.3–21.5)	19.6%[c,d,g] (17.6–21.6)	25.3%[a,b,g] (23.0–27.6)	24.3%[a,b,g] (22.3–26.2)	24.6%[g] (18.3–31.0)	20.2%[g] (17.3–23.1)	4.4%[a,b,c,d,e,f] (1.5–7.3)	22.5% (21.0–24.0)	22.8% (21.4–24.3)	22.7% (21.6–23.7)
3 or more deployments	22.1%[c,d,e,g] (19.4–24.8)	22.5%[c,d,e,g] (20.5–24.4)	12.9%[a,b,f,g] (11.3–14.5)	12.0%[a,b,f,g] (10.7–13.3)	10.2%[a,b,f] (6.9–13.6)	18.0%[c,d,e,g] (15.3–20.7)	2.7%[a,b,c,d,f] (0.3–5.0)	15.4% (14.3–16.6)	15.3% (14.1–16.4)	15.3% (14.5–16.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 10.5
Lifetime Number of Combat Zone Deployments, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
I have not had any combat zone deployments	39.8%[b,c,d,e,f] (35.2–44.4)	18.8%[a,c,d,f] (17.2–20.4)	11.2%[a,b,e] (10.1–12.4)	6.3%[a,b,e] (3.5–9.0)	20.3%[a,c,d,f] (17.2–23.5)	10.6%[a,b,e] (9.3–12.0)
1 deployment	49.6%[c,f] (44.9–54.3)	44.4%[c,f] (42.3–46.5)	32.8%[a,b,e] (30.9–34.6)	40.6% (34.6–46.6)	49.3%[c,f] (45.2–53.3)	35.3%[a,b,e] (33.2–37.4)
2 deployments	8.6%[b,c,d,e,f] (6.2–11.1)	23.8%[a,c,f] (21.9–25.6)	29.6%[a,b,e] (27.7–31.4)	31.2%[a,e] (25.5–36.9)	18.8%[a,c,d,f] (15.7–21.9)	28.2%[a,b,e] (26.2–30.2)
3 or more deployments	2.0%[b,c,d,e,f] (0.9–3.0)	13.0%[a,c,d,f] (11.6–14.4)	26.4%[a,b,e] (24.6–28.2)	21.9%[a,b,e] (17.0–26.8)	11.6%[a,c,d,f] (9.4–13.9)	25.9%[a,b,e] (23.8–27.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 10.6
Lifetime Number of Combat Zone Deployments, by Gender

	Men	Women
I have not had any combat zone deployments	18.3%[a] (17.0–19.6)	27.1% (24.9–29.3)
1 deployment	41.4%[a] (39.9–42.9)	47.3% (45.1–49.6)
2 deployments	23.6%[a] (22.4–24.8)	17.3% (15.8–18.9)
3 or more deployments	16.6%[a] (15.7–17.6)	8.3% (7.2–9.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Lifetime Duration of Deployments

Tables 10.7 through 10.9 present the duration of lifetime deployments among reserve component members across all services, by pay grade, and by gender. Key findings related to lifetime duration of deployments (both combat and noncombat) include the following:

- Among previously deployed service members, total lifetime duration of deployments varied widely: 31.3 percent (95-percent CI: 30.0–32.6) deployed for a total of seven to 12 months, whereas 6.7 percent (95-percent CI: 6.1–7.2) deployed for 49 months or more (Table 10.7).
- Lifetime deployment duration was positively associated with pay grade—that is, higher percentages of senior officers, warrant officers, and senior NCOs reported deploying for

Table 10.7
Lifetime Duration of Deployments, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
1 to 6 months	27.2%[c,d,f] (24.1–30.3)	25.8%[c,d,f] (23.5–28.1)	7.8%[a,b,g] (6.1–9.4)	8.2%[a,b,g] (6.5–9.9)	15.5% (9.0–21.9)	11.6%[a,b,g] (8.6–14.6)	22.5%[c,d,f] (16.2–28.8)	13.3% (12.0–14.6)	13.7% (12.3–15.1)	13.5% (12.6–14.5)
7 to 12 months	29.7% (26.5–32.9)	26.3%[c,d] (24.0–28.7)	33.6%[b,f] (30.9–36.4)	34.1%[b,f] (31.6–36.6)	37.2%[f] (28.9–45.5)	23.7%[c,d,e] (20.3–27.1)	24.2% (17.0–31.5)	30.8% (29.0–32.7)	31.7% (29.8–33.6)	31.3% (30.0–32.6)
13 to 24 months	24.3%[f] (21.5–27.1)	28.4% (26.1–30.6)	28.2% (25.8–30.6)	29.0% (26.8–31.2)	27.6% (20.8–34.3)	34.2%[a] (30.5–37.9)	24.5% (17.9–31.2)	28.5% (26.9–30.1)	28.8% (27.1–30.5)	28.7% (27.5–29.8)
25 to 48 months	14.2%[c,d,f] (11.9–16.4)	13.9%[c,d,f] (12.3–15.6)	22.8%[a,b] (20.7–24.9)	22.0%[a,b] (20.2–23.8)	16.5% (11.6–21.3)	21.5%[a,b] (18.5–24.4)	17.8% (11.6–24.0)	20.2% (18.9–21.6)	19.5% (18.2–20.8)	19.8% (18.9–20.8)
49 months or more	4.7%[c,f,g] (3.4–5.9)	5.5%[f] (4.5–6.6)	7.6%[a] (6.4–8.7)	6.7% (5.7–7.7)	3.3%[f,g] (1.5–5.1)	9.1%[a,b,e] (7.2–11.0)	10.9%[a,e] (6.5–15.3)	7.1% (6.3–7.8)	6.3% (5.6–7.1)	6.7% (6.1–7.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

25 months or more during their service in the military compared with lower pay grades (Table 10.8).

- Men were more likely than women to have deployed for 13 or more months in their lifetime (Table 10.9).

Table 10.8
Lifetime Duration of Deployments, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
1 to 6 months	28.3%[b,c,d,e,f] (24.2–32.5)	12.2%[a,c,d,f] (10.9–13.5)	7.8%[a,b,e] (6.8–8.8)	3.8%[a,b,e] (1.4–6.2)	15.6%[a,c,d,f] (12.6–18.6)	7.4%[a,b,e] (6.3–8.5)
7 to 12 months	51.6%[b,c,d,e,f] (46.9–56.3)	31.7%[a,c,d,e,f] (29.7–33.7)	17.5%[a,b,e,f] (16.0–19.0)	18.9%[a,b,e] (14.0–23.9)	38.1%[a,b,c,d,f] (34.1–42.0)	21.2%[a,b,c,e] (19.4–23.1)
13 to 24 months	14.3%[b,c,d,e,f] (11.0–17.5)	31.6%[a] (29.6–33.6)	32.8%[a] (30.9–34.6)	32.6%[a] (26.8–38.5)	26.8%[a] (23.2–30.4)	32.4%[a] (30.3–34.5)
25 to 48 months	4.6%[b,c,d,e,f] (2.9–6.4)	18.8%[a,c,d,f] (17.2–20.5)	29.2%[a,b,e] (27.3–31.0)	33.3%[a,b,e] (27.7–38.9)	16.1%[a,c,d,f] (13.2–18.9)	29.4%[a,b,e] (27.3–31.4)
49 months or more	1.2%[b,c,d,f] (0.3–2.0)	5.7%[a,c,d,f] (4.7–6.6)	12.7%[a,b,e,f] (11.4–14.1)	11.3%[a,b,e] (7.9–14.8)	3.5%[c,d,f] (2.3–4.7)	9.6%[a,b,c,e] (8.3–10.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 10.9
Lifetime Duration of Deployments, by Gender

	Men	Women
1 to 6 months	12.2%[a] (11.1–13.2)	20.9% (19.1–22.8)
7 to 12 months	30.2%[a] (28.7–31.7)	37.3% (35.0–39.6)
13 to 24 months	29.3%[a] (28.0–30.7)	25.1% (23.3–26.9)
25 to 48 months	21.1%[a] (20.0–22.2)	12.7% (11.3–14.1)
49 months or more	7.2%[a] (6.6–7.8)	3.9% (3.2–4.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

Duration of Recent Deployments

Tables 10.10 through 10.12 present the total duration of recent deployments among reserve component members who had ever deployed across all services, by pay grade, and by gender. Key findings related to duration of a recent deployment (i.e., in the 12 months prior to the survey) include the following:

- Two-thirds (66.7 percent, 95-percent CI: 65.4–68.0) of previously deployed reserve component personnel reported that they had not deployed in the past 12 months. Among personnel who had deployed in the past 12 months, the highest percentage (9.6 percent, 95-percent CI: 8.7–10.5) reported deploying for 10 to 12 months, while the lowest percentage (2.9 percent, 95-percent CI: 2.4–3.4) reported deploying for less than one month (Table 10.10).
- Service members in lower pay grades were more likely than those in higher pay grades to have deployed in the past 12 months (Table 10.11).
- There were no significant differences by gender in total duration of past-year deployments (Table 10.12).

Table 10.10
Total Duration of Deployments in the Past 12 Months, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
I did not deploy in the past 12 months	70.5%[b] (67.3–73.7)	59.2%[a,c,d,f] (56.7–61.8)	68.6%[b] (65.9–71.3)	68.0%[b] (65.6–70.5)	63.3% (54.7–71.9)	67.9%[b] (64.1–71.7)	63.0% (55.4–70.6)	68.3% (66.5–70.2)	65.3% (63.4–67.1)	66.7% (65.4–68.0)
Less than 1 month	1.6%[b,g] (0.9–2.4)	5.9%[a,c,d] (4.7–7.1)	1.6%[b,g] (0.9–2.4)	2.3%[b,g] (1.4–3.3)	3.4% (0.8–6.0)	3.5% (2.1–4.9)	8.0%[a,c,d] (4.2–11.7)	2.3% (1.7–2.8)	3.5% (2.7–4.2)	2.9% (2.4–3.4)
1 to 3 months	6.9%[b] (5.2–8.7)	13.6%[a,c,d,f] (11.8–15.4)	4.9%[b,g] (3.6–6.2)	4.6%[b,g] (3.4–5.7)	10.6% (4.6–16.6)	5.3%[b] (3.6–7.0)	11.4%[c,d] (6.7–16.0)	5.9% (5.0–6.8)	7.4% (6.4–8.4)	6.7% (6.0–7.4)
4 to 6 months	11.8%[c,d] (9.5–14.1)	13.2%[c,d,f] (11.3–15.0)	4.3%[a,b] (3.2–5.4)	4.5%[a,b] (3.4–5.5)	4.6% (1.2–8.0)	6.7%[b] (4.3–9.1)	7.7% (2.7–12.8)	6.4% (5.5–7.3)	7.2% (6.3–8.1)	6.8% (6.2–7.5)
7 to 9 months	6.1% (4.2–7.9)	5.0%[d] (3.7–6.3)	6.4% (5.1–7.8)	9.0%[b] (7.3–10.6)	9.1% (2.6–15.6)	7.4% (5.3–9.5)	4.6% (1.2–7.9)	6.7% (5.7–7.7)	7.7% (6.5–8.9)	7.3% (6.5–8.0)
10 to 12 months	3.1%[c,d,f] (1.8–4.4)	3.1%[c,d,e,f] (2.3–3.9)	14.2%[a,b,g] (11.9–16.4)	11.6%[a,b] (10.0–13.2)	9.0%[b] (3.4–14.5)	9.2%[a,b] (6.9–11.6)	5.4%[c] (2.0–8.9)	10.4% (9.0–11.7)	8.9% (7.8–10.1)	9.6% (8.7–10.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 10.11
Total Duration of Deployments in the Past 12 Months, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
I did not deploy in the past 12 months	47.5%[b,c,d,e,f] (42.8–52.2)	67.4%[a,c,f] (65.3–69.4)	74.2%[a,b] (72.5–76.0)	74.0%[a] (68.7–79.4)	69.1%[a,f] (65.5–72.8)	76.1%[a,b,e] (74.1–78.0)
Less than 1 month	4.9%[b,d] (2.8–6.9)	2.1%[a] (1.5–2.7)	2.9% (2.3–3.5)	1.3%[a] (0.3–2.3)	2.6% (1.4–3.8)	3.5% (2.6–4.3)
1 to 3 months	10.6%[b,c] (7.7–13.4)	5.6%[a] (4.7–6.5)	5.9%[a] (5.0–6.9)	4.7% (1.7–7.6)	5.9% (4.0–7.7)	7.5% (6.1–8.8)
4 to 6 months	10.0%[c,d,f] (7.5–12.4)	7.0%[f] (5.9–8.1)	5.6%[a] (4.7–6.5)	4.0%[a] (1.9–6.2)	6.9% (4.8–9.0)	4.2%[a,b] (3.3–5.1)
7 to 9 months	11.3%[c,f] (8.2–14.4)	7.9%[c,f] (6.7–9.2)	4.1%[a,b,d,e] (3.3–4.9)	8.7%[c,f] (5.0–12.3)	6.9%[c] (5.0–8.8)	4.2%[a,b,d] (3.3–5.1)
10 to 12 months	15.8%[b,c,d,e,f] (12.2–19.5)	10.0%[a,c,f] (8.7–11.3)	7.2%[a,b,f] (6.2–8.2)	7.3%[a] (4.2–10.3)	8.7%[a,f] (6.5–10.8)	4.6%[a,b,c,e] (3.7–5.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Table 10.12
Total Duration of Deployments in the Past 12 Months, by Gender

	Men	Women
I did not deploy in the past 12 months[z]	66.7% (65.2–68.2)	66.8% (64.5–69.0)
Less than 1 month[z]	3.0% (2.5–3.6)	2.2% (1.4–3.0)
1 to 3 months[z]	6.8% (6.1–7.6)	5.9% (4.8–7.1)
4 to 6 months[z]	6.6% (5.9–7.4)	7.9% (6.7–9.1)
7 to 9 months[z]	7.4% (6.5–8.3)	6.4% (5.3–7.6)
10 to 12 months[z]	9.4% (8.4–10.4)	10.8% (9.2–12.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Lifetime Combat Trauma Exposure

Tables 10.13 through 10.15 present the percentages of ever-deployed reserve component service members who reported that they had been exposed to a variety of combat trauma experiences. The list of experiences is based on the 2015 HRBS; however, it only uses those items that independently predicted a set of deployment-related health conditions (e.g., probable PTSD and probable major depression) in a regression model using data from the 2015 HRBS. The final set of six items asks about working with landmines or unexploded ordnance, witnessing members of one's own unit being seriously wounded or killed, knowing someone who was killed in combat, witnessing acts of violence or excessive force that violated rules of engagement, being wounded in combat, and witnessing civilians being seriously wounded or killed.

Key findings related to lifetime combat trauma exposure include the following:

- Overall, 41.2 percent (95-percent CI: 39.9–42.5) of all reserve component service members had experienced at least one of the six combat traumas we measured (Table 10.13). The most frequently endorsed trauma was knowing someone who was killed in combat (25.2 percent, 95-percent CI: 24.1–26.3), and the least-endorsed item was being wounded (3.5 percent, 95-percent CI: 3.0–4.0).
- Service members in the Army Reserve (53.0 percent, 95-percent CI: 50.2–55.8), Army National Guard (51.4 percent, 95-percent CI: 48.9–53.9), and the Marine Corps Reserve (48.7 percent, 95-percent CI: 40.6–56.7), were most likely to have experienced at least one combat trauma (Table 10.13). This service branch–specific pattern was also observed for each individual trauma item.
- Pay grade and traumatic experiences were positively correlated such that, among both enlisted and officers, more senior service members were exposed to combat trauma than were junior enlisted and junior officers (Table 10.14). A similar pattern was found by age: Younger service members were less likely to have experienced combat trauma (Appendix Table D.98). Given that service members of younger age and lower pay grade are less likely to have deployed for extended lengths of time, this is not surprising.
- Roughly one-half of men (43.2 percent, 95-percent CI: 41.7–44.7) and one-third of women (30.0 percent, 95-percent CI: 27.9–32.1) had experienced at least one combat-related trauma, and this gender difference was statistically significant (Table 10.15). Similarly, men were also more likely to have experienced each of the six individual combat trauma items, apart from being wounded in combat.

Table 10.13
Lifetime Combat Trauma Experiences During Deployment, by Service Branch

	Air Force Reserve	Air National Guard	Army Reserve	Army National Guard	Marine Corps Reserve	Navy Reserve	Coast Guard Reserve	Reserve Total	National Guard Total	Total
Any traumatic combat experience	25.4%[c,d,e] (22.6–28.3)	21.0%[c,d,e] (19.0–23.1)	53.0%[a,b,f,g] (50.2–55.8)	51.4%[a,b,f,g] (48.9–53.9)	48.7%[a,b,f,g] (40.6–56.7)	23.8%[c,d,e] (20.7–26.9)	16.8%[c,d,e] (10.8–22.7)	40.3% (38.5–42.1)	41.9% (40.1–43.8)	41.2% (39.9–42.5)
I worked with landmines or other unexploded ordnance	5.7%[c,d,e] (4.0–7.4)	4.7%[c,d,e] (3.6–5.9)	12.4%[a,b,d,f,g] (10.6–14.2)	16.3%[a,b,c,f,g] (14.5–18.0)	19.3%[a,b,f,g] (12.9–25.7)	3.4%[c,d,e] (2.1–4.7)	2.0%[c,d,e] (0.03–4.0)	9.5% (8.4–10.6)	12.7% (11.4–13.9)	11.2% (10.3–12.0)
I witnessed members of my unit or an ally unit being seriously wounded or killed	11.1%[c,d,e] (9.2–13.1)	11.1%[c,d,e] (9.5–12.7)	32.3%[a,b,f,g] (29.7–34.9)	29.0%[a,b,f,g] (26.8–31.1)	27.0%[a,b,f,g] (20.5–33.5)	11.2%[c,d,e] (9.0–13.4)	5.7%[c,d,e] (2.0–9.5)	22.7% (21.2–24.3)	23.4% (21.8–25.0)	23.1% (22.0–24.2)
Someone I knew well was killed in combat	12.2%[c,d,e] (10.2–14.3)	9.0%[c,d,e] (7.6–10.4)	34.7%[a,b,f,g] (32.1–37.3)	33.4%[a,b,f,g] (31.2–35.7)	33.4%[a,b,f,g] (26.4–40.3)	10.7%[c,d,e] (8.7–12.7)	7.7%[c,d,e] (3.2–12.2)	24.5% (23.0–26.1)	25.8% (24.2–27.4)	25.2% (24.1–26.3)
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement	2.8%[c,d] (1.8–3.8)	2.1%[c,d,e] (1.4–2.9)	6.9%[a,b,f,g] (5.5–8.3)	6.8%[a,b,f,g] (5.6–7.9)	6.5%[b,g] (3.4–9.6)	2.8%[c,d] (1.7–4.0)	0.9%[c,d,e] (0.0–2.0)	5.1% (4.3–5.9)	5.3% (4.5–6.1)	5.2% (4.6–5.8)
I was wounded in combat	0.7%[e] (0.2–1.1)	1.1%[e] (0.6–1.6)	5.8%[e] (4.5–7.1)	4.7% (3.7–5.7)	2.7%[a,b,c,f] (1.2–4.3)	1.1%[e] (0.4–1.9)	0.0% (0.0–1.9)	3.4% (2.8–4.1)	3.6% (2.8–4.3)	3.5% (3.0–4.0)
I witnessed civilians being seriously wounded or killed	11.4%[c,d,e] (9.5–13.3)	10.2%[c,d,e] (8.8–11.7)	30.7%[a,b,f,g] (28.2–33.2)	29.6%[a,b,f,g] (27.4–31.8)	30.2%[a,b,f,g] (23.1–37.3)	12.4%[c,d,e] (9.9–14.9)	9.3%[c,d,e] (4.8–13.8)	22.6% (21.0–24.1)	23.6% (22.0–25.1)	23.1% (22.0–24.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Air Force Reserve estimate.

[b] Statistically significantly different from Air National Guard estimate.

[c] Statistically significantly different from Army Reserve estimate.

[d] Statistically significantly different from Army National Guard estimate.

[e] Statistically significantly different from Marine Corps Reserve estimate.

[f] Statistically significantly different from Navy Reserve estimate.

[g] Statistically significantly different from Coast Guard Reserve estimate.

Table 10.14
Lifetime Combat Trauma Experiences During Deployment, by Pay Grade

	E1–E4	E5–E6	E7–E9	W1–W5	O1–O3	O4–O6
Any traumatic combat experience	26.1%[b,c,d,e,f] (21.9–30.4)	41.8%[a,c,d,f] (39.7–44.0)	48.2%[a,b,d,e] (46.2–50.2)	58.1%[a,b,c,e,f] (52.1–64.2)	39.1%[a,c,d,f] (35.1–43.1)	46.4%[a,b,d,e] (44.2–48.7)
I worked with landmines or other unexploded ordnance	7.1%[b,c] (4.7–9.6)	12.1%[a] (10.6–13.6)	14.3%[a,e,f] (12.8–15.9)	13.9% (9.3–18.6)	9.2%[c] (7.0–11.4)	9.3%[c] (8.0–10.7)
I witnessed members of my unit or an ally unit being seriously wounded or killed	14.6%[b,c,d,f] (11.3–17.9)	23.8%[a,c] (21.9–25.6)	28.2%[a,b,e] (26.3–30.1)	31.0%[a,e] (25.4–36.6)	20.8%[c,d] (17.4–24.2)	24.4%[a] (22.5–26.3)
Someone I knew well was killed in combat	14.2%[b,c,d,e,f] (10.6–17.7)	24.4%[a,c,d,f] (22.5–26.3)	32.2%[a,b,e] (30.2–34.1)	39.1%[a,b,e] (33.2–45.0)	22.3%[a,c,d,f] (18.8–25.9)	31.1%[a,b,e] (29.0–33.3)
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement	4.1% (2.4–5.7)	6.3%[f] (5.2–7.3)	5.2% (4.2–6.1)	4.5% (2.1–6.9)	4.1% (2.6–5.6)	4.0%[b] (3.1–4.9)
I was wounded in combat	2.1% (0.8–3.4)	4.1%[f] (3.2–5.0)	4.5%[f] (3.6–5.4)	2.3% (0.9–3.7)	3.5% (1.8–5.2)	2.1%[b,c] (1.4–2.8)
I witnessed civilians being seriously wounded or killed	13.6%[b,c,d,e,f] (10.4–16.7)	23.7%[a,c,d] (21.8–25.6)	28.1%[a,b] (26.2–30.0)	32.1%[a,b,e] (26.4–37.9)	22.5%[a,d] (19.0–26.0)	24.7%[a] (22.7–26.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[e] Statistically significantly different from O1–O3 estimate.

[f] Statistically significantly different from O4–O6 estimate.

Deployment Experiences and Health

A vast body of research has examined the complex relationship between deployment, especially combat deployment, on service member health and well-being after various conflicts (for example, see Bøg, Filges, and Jørgensen, 2018; Institute of Medicine, 2010). The HRBS has long been one of many systematic empirical studies used to assess these associations and one of the only studies to look at repeated cross-sectional snapshots over time. In this section, we explore whether service members who had experienced a recent deployment (i.e., in the past 12 months) significantly differed from their peers who had not deployed in the past year across a range of outcomes.[1] These outcomes cluster in the areas of substance use, mental and emotional health, and physical health and are defined in the same way as in earlier chapters. Finally, we caution readers not to interpret these results as causal. We cannot completely disentangle the timing of the outcomes with respect to the timing of the past-year deployment, though in most cases the outcomes had been measured in the past 30 days.

[1] Note that this group includes those who have never deployed.

Table 10.15
Lifetime Combat Trauma Experiences During Deployment, by Gender

	Men	Women
Any traumatic combat experience	43.2%[a] (41.7–44.7)	30.0% (27.9–32.1)
I worked with landmines or other unexploded ordnance	12.7%[a] (11.7–13.6)	3.0% (2.2–3.7)
I witnessed members of my unit or an ally unit being seriously wounded or killed	25.0%[a] (23.8–26.3)	12.5% (10.9–14.0)
Someone I knew well was killed in combat	26.4%[a] (25.1–27.7)	18.4% (16.7–20.0)
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement	5.4%[a] (4.7–6.1)	4.1% (3.2–5.0)
I was wounded in combat[z]	3.6% (3.1–4.2)	2.8% (1.8–3.7)
I witnessed civilians being seriously wounded or killed	24.8%[a] (23.5–26.0)	13.8% (12.2–15.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from women's estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Deployment and Substance Use

This section describes differences between service members who had and had not deployed in the past 12 months on a range of substance use outcomes, including binge and heavy drinking, current cigarette smoking and use of e-cigarettes, illicit drug use including marijuana, and prescription drug misuse. The results are presented in Table 10.16.

As described in Chapter Five, *binge drinking* was defined as consuming five or more drinks on the same occasion for men and consuming four or more drinks on the same occasion for women at least once in the past 30 days. *Heavy drinking* was defined as binge drinking on at least one or two days per week (i.e., approximately four or five occasions in the past 30 days). Key findings related to alcohol and tobacco use include the following:

- Three in ten (29.3 percent, 95-percent CI: 27.0–31.6) service members who had deployed in the past 12 months reported binge drinking at least once in the past 30 days. This was not a significantly higher percentage than among service members who did not experience a recent deployment (28.9 percent, 95-percent CI: 27.7–30.1).
- Similar percentages of recently deployed service members (8.4 percent, 95-percent CI: 7.0–9.9) and those who were not recently deployed (7.2 percent, 95-percent CI: 6.5–8.0) engaged in heavy drinking in the past 30 days.

Table 10.16
Substance Use, by Recent Deployment

	Deployed in Past 12 Months	Not Deployed in Past 12 Months
Binge drinking, past 30 days[z]	29.3% (27.0–31.6)	28.9% (27.7–30.1)
Heavy drinking, past 30 days[z]	8.4% (7.0–9.9)	7.2% (6.5–8.0)
Cigarette smoking, past 30 days[z]	15.1% (13.0–17.2)	13.0% (12.0–13.9)
E-cigarette use, past 30 days[z]	8.7% (7.1–10.3)	10.2% (9.2–11.1)
Any substance use excluding marijuana, past 30 days[z]	0.3% (0.04–0.5)	0.3% (0.2–0.4)
Any marijuana or synthetic cannabis use, past 30 days	0.6%[a] (0.2–1.1)	1.5% (1.0–1.9)
Any prescription drug misuse, past 12 months[z]	1.2% (0.7–1.8)	1.8% (1.4–2.3)
Prescription stimulant misuse[z]	0.4% (0.2–0.6)	0.6% (0.3–1.0)
Prescription sedative misuse[z]	0.6% (0.2–0.9)	0.6% (0.4–0.8)
Prescription pain reliever misuse[z]	0.6% (0.2–0.9)	1.1% (0.8–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Not Deployed estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Key findings related to tobacco use include the following:

- Service members who had recently deployed (15.1 percent, 95-percent CI: 13.0–17.2) were no more likely to report smoking cigarettes than those who did not deploy (13.0 percent, 95-percent CI: 12.0–13.9).
- Use of e-cigarettes in the past 30 days did not significantly differ between recent deployers (8.7 percent, 95-percent CI: 7.1–10.3) and service members who had not recently deployed (10.2 percent, 95-percent CI: 9.2–11.1).

Table 10.16 also shows past-30-day use of several types of drugs, including marijuana and synthetic cannabis, inhalants, synthetic stimulants, nonprescription cough or cold medicine, nonprescription anabolic steroids, and drugs other than marijuana and synthetic cannabis (cocaine [including crack], LSD, PCP, MDMA [commonly called ecstasy], methamphetamine, heroin, and GHB).[2] Key findings related to marijuana use and drug use include the following:

[2] Unlike Chapter Five, this version of the substance use variable includes cough or cold medicine and anabolic steroids.

- Though few respondents reported any drug use in the past 30 days, service members who had recently deployed were significantly less likely to have used marijuana or synthetic cannabis in the past 30 days (0.6 percent, 95-percent CI: 0.2–1.1) than service members who had not (1.5 percent, 95-percent CI: 1.0–1.9).

Finally, Table 10.16 also shows *misuse* of prescription drugs, defined as use of a prescription drug in any way not directed by a doctor, which could include use without a prescription of one's own or using it in greater amounts, more often, or longer than it was prescribed. Key findings related to prescription misuse include the following:

- Prescription drug misuse by service members who had deployed in the past 12 months did not differ significantly from service members who had not recently deployed. The same was true for misuse of prescription stimulants, sedatives, and pain relievers.

Deployment and Mental and Emotional Health

This section describes differences between reserve component service members who had and had not deployed in the past 12 months on a range of mental and emotional health outcomes, including psychological distress, PTSD, and sleep quality. Results are presented in Table 10.17.

As described in Chapter Six, overall mental health status was assessed using the K6 (Kessler, Barker, et al., 2003), a commonly used measure of nonspecific serious psychological distress. The K6 is designed to distinguish between distress that indicates the presence of a psychiatric disorder that a clinician would recognize and treat and distress that is commonly experienced but not suggestive of a clinical condition. In the 2018 HRBS, mental health status was assessed for the past 30 days and for the worst 30 days of the past year. Respondents with sum scores greater than or equal to 13 were categorized as having serious psychological distress. Respondents were also asked about PTSD symptoms using the PC-PTSD-5 (Prins, Bovin, et al., 2016), a brief, standardized rating scale for PTSD. We chose a cut point of three or higher to indicate probable PTSD, which is the cut point shown to be optimally sensitive to probable PTSD in prior studies (Prins, Bovin, et al., 2016). This section also presents results of respondents' self-rated sleep quality in the past 30 days.

Key findings related to psychological distress, PTSD, and sleep quality include the following:

- Significantly fewer recently deployed reserve component service members met the criteria for serious psychological distress in the past 12 months (8.0 percent, 95-percent CI: 6.6–9.3) compared with those who did not recently deploy (11.3 percent, 95-percent CI: 10.4–12.3; Table 10.17). Differences in moderate distress and no or low distress were observed but did not reach statistical significance.
- Recently deployed service members were also significantly less likely to report serious psychological distress in the past 30 days (4.7 percent, 95-percent CI: 3.7–5.8) than those who had not recently deployed (6.8 percent, 95-percent CI: 6.1–7.6).
- Twelve percent of recently deployed service members reported probable PTSD (12.0 percent, 95-percent CI: 10.4–13.6); this figure was significantly higher than among those who did not recently deploy (10.1 percent, 95-percent CI: 9.4–10.9).
- Most differences in self-reported sleep quality by recent deployment were not statistically significant, with one exception. Significantly fewer recently deployed service members reported very good sleep quality (13.5 percent, 95-percent CI: 11.7–15.2) than those who had not recently deployed (16.3 percent, 95-percent CI: 15.3–17.4).

Table 10.17
Mental and Emotional Health Indicators, by Recent Deployment

	Deployed in Past 12 Months	Not Deployed in Past 12 Months
Psychological distress (K6), past 12 months		
No to low distress[z]	80.8% (78.8–82.9)	78.6% (77.4–79.7)
Moderate distress[z]	11.2% (9.5–12.9)	10.1% (9.3–10.9)
Serious distress	8.0%[a] (6.6–9.3)	11.3% (10.4–12.3)
Psychological distress (K6), past 30 days		
No to low distress[z]	85.3% (83.3–87.2)	83.5% (82.4–84.5)
Moderate distress[z]	10.0% (8.3–11.7)	9.7% (8.9–10.5)
Serious distress	4.7%[a] (3.7–5.8)	6.8% (6.1–7.6)
Probable PTSD (PC-PTSD-5 score ≥3)	12.0%[a] (10.4–13.6)	10.1% (9.4–10.9)
Sleep quality in past 30 days		
Very good	13.5%[a] (11.7–15.2)	16.3% (15.3–17.4)
Fairly good[z]	59.6% (57.2–62.1)	58.8% (57.5–60.2)
Fairly bad[z]	22.5% (20.5–24.5)	21.1% (20.0–22.1)
Very bad[z]	4.4% (3.4–5.4)	3.8% (3.3–4.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Not Deployed estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Deployment and Physical Health

This section describes differences between reserve component service members who had and had not deployed in the past 12 months on a range of physical health outcomes, including pain, TBI and postconcussive syndrome, and self-rated health. Results are presented in Table 10.18.

As described in Chapter Seven, the 2018 HRBS measured physical symptoms using the eight symptoms in the Somatic Symptom Scale-8 (Gierk et al., 2014), developed from a subset of eight of the 15 PHQ-15 items (Kroenke et al., 2002). Consistent with the PHQ-15, service members reported being not bothered at all, bothered a little, or bothered a lot by stomach or bowel problems; back pain; pain in the arms, legs, or joints; headaches; chest pain or shortness of breath; dizziness; feeling tired or having low energy; and trouble sleeping. *High physical*

Table 10.18
Physical Health, by Any Deployment in Past 12 Months

	Deployed in Past 12 Months	Not Deployed in Past 12 Months
Pain symptoms		
Any bodily pain (back, arms, legs, or joints), past 30 days	22.6%[a] (20.5–24.6)	17.7% (16.8–18.7)
Any bodily pain, including headache, past 30 days	24.7%[a] (22.6–26.8)	20.3% (19.3–21.3)
High physical symptom severity, past 30 days	13.1%[a] (11.4–14.7)	10.5% (9.8–11.3)
TBI and postconcussive symptoms		
Positive screen for mTBI, past 12 months	5.7%[a] (4.6–6.7)	4.0% (3.5–4.6)
Positive screen for moderate to severe TBI, past 12 months[z]	0.1% (0.004–0.2)	0.2% (0.05–0.3)
Postconcussive symptoms, past 30 days	3.6%[a] (2.8–4.4)	2.5% (2.1–2.9)
Self-rated health		
Excellent[z]	15.5% (13.6–17.4)	17.3% (16.3–18.3)
Very good[z]	41.9% (39.5–44.4)	40.0% (38.7–41.3)
Good[z]	34.0% (31.6–36.3)	33.3% (32.0–34.6)
Fair[z]	7.6% (6.3–8.9)	8.2% (7.5–9.0)
Poor[z]	1.0% (0.6–1.4)	1.2% (0.9–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from Not Deployed estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

symptom severity was defined as an average item score of 1 (bothered a lot) or more (Kroenke et al., 2002), for a total score of 8 or higher. In this section, we report estimates of service members with high physical symptom severity and those bothered a lot by at least one symptom (including and excluding headaches) in the past 30 days, by recent deployment.

This section also reports estimates of mTBI and moderate to severe TBI, and postconcussive symptoms, by recent deployment. TBI and mTBI were assessed using the Brief Traumatic Brain Injury Screen (Schwab et al., 2006). Service members screened positive for postconcussive symptoms if they screened positive for TBI or mTBI and endorsed four or more postconcussive symptoms. Service members were also asked to self-report their overall physical health.

Key findings related to physical health and recent deployment include the following:

- Significantly more recently deployed service members reported any bodily pain including headache in the past 30 days (24.7 percent, 95-percent CI: 22.6–26.8), any bodily pain excluding headache (22.6 percent, 95-percent CI: 20.5–24.6), and high physical symptom severity (13.1 percent, 95-percent CI: 11.4–14.7) compared with those who had not recently deployed (bodily pain including headache: 20.3 percent, 95-percent CI: 19.3–21.3; bodily pain excluding headache: 17.7 percent, 95-percent CI: 16.8–18.7; and high physical symptom severity: 10.5 percent, 95-percent CI: 9.8–11.3, respectively).
- Fewer than one in ten recently deployed service members screened positive for TBI or mTBI. However, significantly more (5.7 percent, 95-percent CI: 4.6–6.7) screened positive for mTBI in the past year compared with those who had not recently deployed (4.0 percent, 95-percent CI: 3.5–4.6).
- Most recently deployed service members rated their health as very good or excellent (combined 57.4 percent). These ratings were not significantly different from service members who did not recently deploy (combined 57.3 percent).

Summary

The analyses in this chapter provide insight into how recent deployment is associated with reserve component service members' physical and mental health outcomes and propensity for risk behaviors. Understanding this association is important given that service members often deploy more than once in their career and the negative consequences for health and health behaviors that result from one deployment can potentially impact readiness for future deployments.

A majority of the 2018 HRBS sample had experienced at least one deployment since joining the military, though roughly one-fifth of ever-deployers had not yet experienced a combat deployment. Exposure to combat trauma was common, with over one-third of service members reporting that they had experienced at least one of the six experiences asked about in the survey.

Problematic use of alcohol, cigarette smoking, and e-cigarette use were not different between reserve component service members who had recently deployed (that is, in the past 12 months) and nondeployers. Use of marijuana was less common among service members who had recently deployed than among nondeployers. This could be due to lack of access in a deployed environment. Use of other drugs and prescription drug misuse was far less common among recent deployers and nondeployers, and there were no differences between the two groups.

We also observed that a significant number of previously deployed service members reported current mental and emotional health problems. Of those deploying recently, roughly one-fifth met the criteria for moderate or serious psychological distress in the past 12 months, and just over one-tenth met the criteria for probable PTSD. However, only for serious psychological distress did we see a significant difference between the groups, with the recently deployed reporting less distress than their nondeployed counterparts. Though this finding may seem counterintuitive, it aligns with what existing research has called the "healthy warrior

effect" (Haley, 1998; Larson, Highfill-McRoy, and Booth-Kewley, 2008; Wilson et al., 2009). The healthy warrior effect refers to the fact that only those healthy enough to make it through basic training are eligible to deploy. In other words, service members with better psychological health are more likely to deploy.

Of recently deployed reserve component service members, 5.7 percent screened positive for probable mTBI, and 3.6 percent had experienced or reported postconcussive symptoms in the past 30 days. TBI has become a signature physical injury among the armed forces; results from this analysis indicate that recently deployed reserve component service members were more likely to screen positive for mTBI and report postconcussive symptoms than those who did not recently deploy.

CHAPTER ELEVEN

Summary and Policy Implications

The HRBS is DoD's flagship survey for understanding the health, health-related behaviors, and well-being of service members. At the request of the Defense Health Agency, RAND revised, administered, and analyzed the 2018 version of the survey to both the active and reserve components. This report has detailed the study for the reserve component, including the methodology, sample demographics, and results across the following domains: health promotion and disease prevention, substance use, mental and emotional health, physical health and functional limitations, sexual behavior and health, sexual orientation and health, and deployment experiences and health. We examined differences across several subgroups, including service branch, pay grade, gender, race/ethnicity, and age group.

The 2018 HRBS represents the first time the survey was offered confidentially on the internet. The overall, weighted response rate for the reserve component was 9.4 percent, resulting in 16,475 usable surveys. Though low response rates are not necessarily indicative of biased data, they are a reason to be cautious when interpreting results. The 2018 HRBS is also the first time that imputation was used for missing data.

This chapter provides a high-level overview of findings from each of the domains in the survey, as well as an overview of comparisons with HP2020 goals and between the reserve and active components. The chapter concludes with policy implications for improving the health and well-being of the reserve component and future iterations of the HRBS.

Health Promotion and Disease Prevention

Within this domain, we examined weight status, physical activity, screen time, health insurance, annual physical assessments, and sleep. Key findings include the following:

- Over one-quarter (31.4 percent) of the reserve component were normal weight based on their BMI, and one-fifth (19.0 percent) were classified as obese. The rate of obesity in the reserve component was still well below the rate in the general population (31.4 percent), as well as below the HP2020 goals (30.5 percent or less).
- Well over half of reserve component service members (67.2 percent) reported that they engaged at least 150 minutes per week of MPA or at least 75 minutes per week of VPA, and almost half (41.6 percent) reported 300 or more minutes of MPA per week or more than 150 minutes of VPA per week. The reserve component exceeded the HP2020 goal for physical activity. Additionally, 43.1 percent of service members reported engaging in strength training at least three days per week. Overall, the reserve component also

exceeded the HP2020 goal for strength training. However, a statistically significant smaller portion of women engaged in both types of activities.
- Junior enlisted service members, who are also the youngest service members, were, on average, more likely to report engaging in five or more hours of screen time per day (31.5 percent) than older service members.
- Fewer than three-quarters (71.6 percent) of reserve component respondents reported having an annual physical exam, despite the requirement that every service member, including reservists, have one.
- Eight percent of reserve component service members reported having no health insurance of any kind.
- We found that less than half (45.4 percent) of reserve component service members reported getting the recommended seven or more hours of sleep per night, one-quarter rated their sleep as very bad or fairly bad, and nearly 20 percent of respondents reported being severely or moderately bothered by a lack of sleep. The reserve component did not meet the HP2020 goal for recommended hours of sleep (72.8 percent). Fewer than 3 percent reported use of either OTC or prescription medications to help them stay awake.

Substance Use

Within this domain, we examined use of alcohol, tobacco and nicotine, marijuana and synthetic cannabis, other drugs, and prescription drugs. Key findings include the following:

- According to survey estimates, 29.0 percent of reserve component service members were current binge drinkers, and 7.4 percent were current heavy drinkers.
- Approximately 5 percent (4.8 percent) reported one or more serious consequences from drinking in the past year, with 6.1 percent reporting any risky drinking and driving behavior and 5.3 percent reporting work-related productivity loss from alcohol use.
- Approximately one-fifth (20.2 percent) of all reserve component service members agreed with at least one of the statements that military culture was supportive of drinking: finding it hard to "fit in" with one's command if they did not drink, belief that drinking was part of being in one's unit, belief that everyone was encouraged to drink at social events, and belief that leaders were tolerant of drunkenness when personnel were off duty.
- An estimated 30.5 percent of service members currently used tobacco in some form. This rate was higher than estimated rates of current tobacco use in the general population (approximately 19.3 percent). Rates of e-cigarette use were also higher among reserve component service members (9.9 percent) than in the general population (4.6 percent; CDC, 2017).
- Cigarettes were the most common type of tobacco used (13.3 percent), followed by smokeless tobacco (11.0 percent) and e-cigarettes (9.9 percent).
- Few reserve component service members reported use of any drugs in the past 12 months (2.7 percent). Less than 1 percent reported use of any nonprescription cough or cold medicine in the past year (0.4 percent) or drugs other than marijuana and synthetic cannabis (0.7 percent), including cocaine or crack, LSD, PCP, MDMA, methamphetamine, heroin, and GHB. Less than 3 percent reported use of marijuana or synthetic cannabis in the past 12 months.

- Slightly more than 1 percent (1.4 percent) of all reserve component service members reported use of drugs in the past 30 days. Similarly, 1.3 percent reported use of marijuana or synthetic cannabis, and only 0.2 percent reported use of drugs other than marijuana and synthetic cannabis in the past 30 days.
- Regarding prescription drugs, results suggest lower rates of past-year use of stimulants, sedatives, and pain relievers among service members compared with civilians. Prescription pain relievers were the most common prescription used by reserve component service members (8.3 percent).
- Among reserve component service members, 1.7 percent misused one or more types of prescription drugs in the past year. Rates of misuse were low in the absolute sense, but prescription pain relievers were misused most often (1.0 percent).

Mental and Emotional Health

Within this domain, we examined mental health indicators (i.e., serious psychological distress and PTSD), social and emotional factors associated with mental health (i.e., angry and aggressive behaviors, unwanted sexual contact, physical abuse, problematic gambling), suicide (including suicidal ideation, suicide plans, and suicide attempts), mental health service utilization, perceived unmet mental health treatment need, barriers to utilizing mental health services, and concerns that mental health treatment would damage one's military career. Key findings include the following:

- Approximately 6.5 percent of reserve component service members reported serious psychological distress in the past 30 days, and 10.5 percent of service members evidenced probable PTSD. Prevalence of both serious psychological distress and probable PTSD in the reserve component was higher than rates observed among the general population (2.9 percent to 5.2 percent for serious psychological distress [Center for Behavioral Health Statistics and Quality, 2018]; 4 percent for PTSD [Kessler, Berglund, et al., 2004]).
- Nearly half (46.9 percent) of reserve component service members reported any angry or aggressive behavior in the past 30 days.
- Among all reserve component service members, 7.8 percent indicated experiencing any unwanted sexual contact since joining the military, with 1.6 percent of individuals indicating that they had experienced unwanted sexual contact in the past year. Women were significantly more likely to indicate experiencing unwanted sexual contact than men. Among women, approximately 24.0 percent responded that they had experienced unwanted sexual contact since joining the military, and 4.6 percent indicated that they had experienced unwanted sexual contact in the past 12 months; in contrast, rates were 3.6 percent and 0.8 percent, respectively, among men. It is important to remember that the measure of unwanted sexual contact used in the 2018 HRBS is not comparable with any other civilian or military survey, including the WGRA and the WGRR.
- Few reserve service members indicated experiencing a physical assault while in the military (3.8 percent) or in the past year (0.7 percent). By comparison, in the general population, approximately 1.7 percent of individuals ages 12 and older reported experiencing a physical assault in the past year (Morgan and Kena, 2018).
- In the 2018 HRBS reserve component, 6.0 percent of all service members endorsed having thoughts of suicide in the past 12 months, 2.0 percent reported suicide plans, and

0.9 percent reported a suicide attempt. Rates of suicide ideation, plans, and attempts were slightly higher than those observed among the general U.S. population: Among adults aged 18 or older in the general population, 4.3 percent endorsed thoughts of suicide, 1.3 percent endorsed suicide plans, and 0.6 percent reported a suicide attempt in the past year (Substance Abuse and Mental Health Services Administration, 2019a).

- The prevalence of problem gambling in the total reserve component sample was approximately 1.7 percent, which is lower than the prevalence of pathological gambling in the U.S. civilian population (2.3 percent; Kessler, Hwang, et al., 2008).
- Overall, one-fifth (21.0 percent) of reserve component service members reported using any mental health services. This proportion is higher than in the general population, according to the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a).
- Reserve component service members were about equally likely to receive mental health treatment from specialty mental health providers (13.5 percent) as from general medical providers (12.7 percent). This pattern differs from that observed in the general population, where most individuals who receive mental health care receive that care from general medical providers (Olfson et al., 2019).
- The percentage of reserve component service members who received mental health services at a civilian health facility (10.3 percent) was higher than the percentage receiving mental health services at a military facility (5.7 percent) or a VA facility (5.4 percent).
- Approximately 8.2 percent of reserve component service members reported using a medication for a mental health condition in the past year. In contrast with service members, medication is the most commonly received form of mental health treatment in the general population, with about 12 percent of adults age 18 and over reporting using a prescription medication for a mental health problem in the past year (Substance Abuse and Mental Health Services Administration, 2019a).
- The percent of all reserve component service members reporting unmet need for mental health treatment in the past year was 4.6 percent. Among those with stated unmet need for treatment or a positive screen for moderate or severe psychological distress, the most commonly endorsed reason for not receiving care was thinking that treatment was not needed at the time. This is consistent with findings from the civilian literature suggesting that low perceived need for treatment is the most common reason that people with mental health problems do not seek care (Mojtabai, Olfson, and Mechanic, 2002).
- The proportion of respondents who endorsed the idea that seeking mental health treatment would damage a person's military career was 29.9 percent. This proportion did not differ significantly across service branches.

Physical Health and Functional Limitations

Within this domain, we examined chronic health conditions (e.g., hypertension, high cholesterol, diabetes, etc.), physical symptoms, pain, TBI, mTBI, postconcussive symptoms, and self-reported health. Key findings include the following:

- Overall, 36.6 percent of reserve component service members reported being told by a health care provider that they had at least one chronic condition. The most common

conditions were bone, joint, or muscle injury and back pain. Rates of hypertension, high cholesterol, and diabetes were low relative to the general population.
- The most commonly reported physical symptoms included trouble sleeping and feeling tired or having low energy. Back pain and pain in the arms, legs, and joints were also common. Approximately 21.1 percent reported bodily pain, including headache. There was a disparity in rates of pain for enlisted personnel versus officers, particularly at senior pay grades.
- An estimated 4.3 percent of service members screened positive for mTBI, and an estimated 2.7 percent reported postconcussive symptoms. Higher rates were observed among enlisted service members than among certain categories of officers. Rates of moderate to severe TBI were low (0.2 percent).
- Across services, 57.4 percent of reserve component service members reported that their health was very good or excellent. Junior enlisted personnel, junior officers, and senior officers had significantly higher rates of excellent health than midcareer and senior enlisted reserve component service members.
- On average, reserve component service members reported missing 0.53 days of work (i.e., absenteeism) and experiencing reduced productivity (i.e., presenteeism) on 1.50 days in the past 30 days.

Sexual Behavior and Health

Within this domain, we examined past-year sexual risk behaviors, STIs and unintended pregnancies, use of and access to contraceptives, and HIV testing. Key findings include the following:

- Risky sexual behavior among reserve component members was not uncommon: 15.9 percent reported more than one sex partner in the past year, 33.2 percent did not use condoms with new sex partners, and 17.7 percent were at high risk for HIV infection at the time of the survey. Rates of these behaviors were highest in the Marine Corps Reserve and among junior enlisted personnel.
- A total of 1.9 percent of reserve component members reported a past-year STI, with no statistically significant differences by service branch or pay grade. Rates of STIs were higher among women (4.0 percent) than men (1.3 percent).
- Among women, 3.2 percent reported an unintended pregnancy in the past year; for men, the percentage was 2.3. Unintended pregnancy rates did not differ significantly by service branch. Unintended pregnancy during deployment was extremely rare (0.02 percent).
- A total of 19.1 percent of reserve component members reported that they did not use any contraception at most-recent vaginal sex. At the same time, only 73.8 percent of women at risk for pregnancy used contraception at last sex, nearly 18 percentage points short of the 91.6 percent HP2020 goal.
- Less-than-highly-effective contraceptive methods were used by roughly one-third of reserve component members and were the most commonly used methods overall. Junior enlisted personnel were the least likely to report using highly effective methods and the most likely to report using other methods.

- Most reserve component members did not receive any contraceptive counseling prior to deployment. Counseling rates were significantly lower for men (15.2 percent) than for women (33.4 percent). Most women who sought birth control before (82.3 percent) or during deployment (73.7 percent) were able to access the method they preferred, although this leaves a notable percentage (roughly 18 and 26 percent, respectively) without such access. In contrast, most men who sought birth control before or during deployment were unable to get their preferred method (12.2 percent were able to access it before deployment, and 14.0 percent were able to access it during deployment). The small number of reserve component members who had deployed in the year prior to the survey limited our ability to test for differences in contraceptive counseling and access by service branch and pay grade.
- A total of 71.4 percent of reserve component members reported past-year HIV testing. Among MSM, reserve component members exceeded the HP2020 target for HIV testing (84.2 versus 68.4 percent). Still, a notable percentage of both MSM and those at high risk (more broadly defined), roughly one-fifth, were not tested during this recommended period.

Sexual Orientation and Health

Within this domain, we provided an estimate of the percentage of men and women serving in the reserve component who were LGB and key information about the health-related behavior and health status of LGB service members. Key findings include the following:

- Overall, 2.8 percent of servicemen and 9.8 percent of servicewomen reported one or more same-sex partners in the prior year.
- Just over 6 percent (6.1 percent) of all reserve component service members identified as LGB. Significantly more women (15.4 percent) than men (3.8 percent) identified as LGB.
- The Navy Reserve and Army National Guard had the highest percentage of LGB service members.
- LGB personnel were most often junior enlisted personnel and were more often under age 35 rather than 35 or older.
- LGB service members were less likely to be overweight or obese (54.6 versus 66.1 percent) but also less likely to have had a routine checkup in the past 12 months (67.0 percent versus 71.9 percent) and less likely to have good or fairly good sleep quality in the past 30 days (68.8 percent versus 75.2 percent), compared with non-LGB members.
- Compared with their non-LGB counterparts, LGB service members were more likely to engage in binge drinking (37.5 versus 28.4 percent) and heavy drinking (12.0 versus 7.1 percent) and to smoke regular cigarettes (21.5 versus 12.8 percent). They were more than twice as likely to use e-cigarettes (19.2 versus 9.3 percent) and four times more likely to have used any illicit drug in the past 30 days (9.3 percent versus 2.3 percent) as non-LGB service members. Use of prescription pain relievers in the past year was also somewhat higher among LGB versus non-LGB members (11.0 percent versus 8.1 percent); however, LGB service members were less likely to use smokeless tobacco than other personnel (5.6 percent versus 11.3 percent).

- LGB service members also engaged in more risky sexual behavior and had more negative sexual health outcomes on some measures. They were more likely to have had sex with a new partner without a condom in the past 12 months (39.4 versus 32.7 percent), more likely to have had more than one sex partner in the past 12 months (33.5 versus 14.7 percent), and more likely to have had an STI in the past 12 months (6.2 versus 1.6 percent) than their non-LGB peers. However, LGB personnel were more likely than non-LGB personnel to have had an HIV test in the past six months (45.5 versus 38.0 percent).
- LGB service members were more likely than their non-LGB peers to suffer from a host of mental and emotional health issues in the past year. These include serious psychological distress (23.7 versus 9.9 percent), probable PTSD (17.7 versus 10.0 percent), and angry or aggressive behavior (52.7 versus 46.5 percent). Rates of suicidal ideation (17.7 versus 5.2 percent) and suicide attempts (2.4 versus 0.8 percent) were about three times higher among LGB versus non-LGB personnel. Use of mental health services by LGB service members was also higher, including care from mental health specialists (26.0 versus 12.7 percent) and general medical doctors (23.6 versus 11.9 percent). Use of medications for mental health issues in the past year was also more common among LGB service members (16.1 versus 7.7 percent). Finally, both perceived unmet need for treatment (10.8 versus 4.1 percent) and perceived career-related stigma (39.0 versus 29.3 percent) were greater among LGB service members.
- LGB service members were substantially more likely than their non-LGB peers to indicate experiencing unwanted sexual contact both since joining the military (22.7 versus 6.8 percent) and in the past year (7.2 versus 1.2 percent). LGB service members were also more likely than their non-LGB peers to indicate having been physically assaulted both since joining the military (7.2 versus 3.6 percent) and in the past year (1.8 versus 0.6 percent).
- LGB members of the reserve component were more than twice as likely to report a diagnosis of asthma than their non-LGB counterparts (4.4 percent versus 1.8 percent).
- We did not find significant differences between LGB and non-LGB service members in rates of other common chronic conditions (e.g., high blood pressure, diabetes, high cholesterol, and asthma); unintended pregnancy; use of birth control at last vaginal intercourse; having an HIV test in the past year; amount of physical exercise; average amount of nightly sleep; back pain; and bone, joint or muscle injuries.

Deployment Experiences and Health

Within this domain, we examined the frequency and duration of deployments (including both combat and noncombat deployments), combat trauma exposure, and deployment experiences and health. Key findings include the following:

- Across all services, just over half of reserve component service members (52.9 percent) had deployed at least once, either in a combat or noncombat environment. Similarly, just under half (47.1 percent) reported never having deployed.
- Roughly one-fifth (19.7 percent) of all service members who have ever deployed had never been on a combat deployment.
- Two-thirds (66.7 percent) of previously deployed reserve component personnel reported that they had not deployed in the past 12 months.

- Overall, roughly 40 percent (41.2 percent) of all reserve component service members had experienced at least one of the six types of combat traumas we measured. The most frequently endorsed trauma was knowing someone who was killed in combat (25.2 percent), and the least endorsed item was being wounded (3.5 percent).

We examined several categories of outcomes between service members who had and had not deployed in the past year.

- Substance use: Recent deployers were significantly less likely to have used marijuana or synthetic cannabis in the past 30 days than nondeployers (1.5 versus 0.6 percent).
- Mental and emotional health: Similarly, significantly *fewer* recent deployers met the criteria for past-year serious psychological distress (8.0 versus 11.3 percent) and past-30-day serious distress (4.7 versus 6.8 percent) compared with those who had not recently deployed. However, the rate of probable PTSD was significantly higher among the recently deployed versus those who were not (12.0 versus 10.1 percent). Significantly fewer recent deployers reported that their sleep quality was "very good" compared with those who had not deployed in the past 12 months (13.5 versus 16.3 percent).
- Physical health: Significantly more recent deployers reported any bodily pain in the past 30 days (22.6 versus 17.7 percent); any bodily pain, including headaches (24.7 versus 20.3 percent); and higher physical symptom severity (13.1 versus 10.5 percent). Finally, the rate of mTBI was significantly higher among recent deployers than nonrecent deployers (5.7 versus 4.0 percent).

Comparisons with Healthy People 2020 Goals

DoDI 1010.10 states that it is DoD policy to "[s]upport the achievement of the Department of Health and Human Services' vision for improving the health of all Americans as outlined in Healthy People 2020." As such, it is important to be able to compare results from the HRBS with HP2020 goals to see how well the military is doing compared with these goals. However, we caution readers that making direct comparisons between the military and civilian populations ignores the fact that the two groups are very different on some sociodemographic characteristics (e.g., gender, age) related to the health outcomes and health behaviors of interest. That said, members of the reserve component, who generally spend more time outside of active duty military service, might look more like their civilian peers.

Table 11.1 shows comparisons between HP2020 goals and findings from the 2018 HRBS. Green cells indicate where the reserve component was doing as well or better than the relevant HP2020 goal; red cells indicate where it was doing worse. The table presents only HP2020 goals where the HRBS was comparable (or nearly comparable). This means that for some areas where HP2020 has objectives but not concrete goals, we did not make comparisons (e.g., prescription drug misuse, diabetes, asthma).

The reserve component is doing well with respect to several HP2020 goals: obesity, physical activity, strength training, high blood pressure, high cholesterol, and HIV testing among MSM. However, on several HP2020 topics, reserve component service members fall short of HP2020 goals. Binge drinking and tobacco use (including cigarettes, cigars, and smokeless tobacco) are both areas where the prevalence of service members behaviors were much higher

Table 11.1
Comparison of 2018 HRBS Reserve Component with HP2020 Goals for Select Outcomes

Topic	HP2020 Goal	2018 HRBS
Health promotion and disease prevention		
Obesity (ages 20+)	30.5% (or less)	19.0%
Normal weight (ages 20+)	(at least) 33.9%	31.4%
MPA at least 150 mins/week or VPA at least 75 mins/week	(at least) 47.9%	67.2%
MPA for more than 300 mins/week or VPA for at least 150 mins/week	(at least) 31.3%	41.6%
Muscle-strengthening activities on 3+ days/week[a]	(at least) 24.1%	43.1%
Sleep: 8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21	(at least) 72.8%	45.4%
Substance use		
Binge drinking	24.2% (or less)	29.0%
Current cigarette smoking	12.0% (or less)	13.3%
Current cigar smoking	0.3% (or less)	8.0%
Current smokeless tobacco use	0.2% (or less)	11.0%
Physical health and functional limitations		
High blood pressure	26.9% (or less)	9.3%
High cholesterol	13.5% (or less)	6.8%
Sexual behavior and health		
Use of contraceptive at most-recent sex (ages 15–44)	91.6% (or higher)	73.8%[b]
Use of moderately or most-effective contraceptive (ages 20–44)	69.3% (or higher)	60.3%
Annual HIV testing among MSM	68.4% (or higher)	84.2%

NOTES: HP2020 goals can be found at Healthy People, 2020a–2020u. The 2018 HRBS data in this table come from the "Total" column in the relevant tables in Chapters Four through Eight.

[a] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated in this way. Instead, the HRBS value represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

[b] The HRBS estimate is for women ages 17 to 44 because women below that age are not eligible to join the military.

than the goals set by HP2020. Adequate amount of sleep is another potential area of concern, as the percentage of reserve component service members who achieve this metric was below the HP2020 goal. Finally, contraceptive use and prevention of unintended pregnancy are also areas where the reserve component could improve.

Comparisons with the 2018 HRBS Active Component Sample

Given demographic differences between the active and reserve components, making direct comparisons between the two is not necessarily advised. We did employ a regression model approach that allowed us to compare between the two components. It is important to note that not all of the differences between the surveys can be accounted for by this method, though we were able to include a number of important military and demographic characteristics as covariates in our model (e.g., service branch, pay grade, age, marital status). Table 11.2 summarizes the results of these comparisons (based on ARRs). Outcomes are grouped by substantive area, as they are in the main body of the report, and focus only on overall difference (i.e., across all service branches). Details about cross-survey differences by service branch, pay grade, and gender can be found in Chapters Four through Eight. Because almost all the outcomes in these chapters can be compared across components, the table condenses some information into a single cell (e.g., multiple physical conditions), and not all outcomes are shown.

Rather than focus on actual numbers, the chart below uses a stoplight approach—green topics indicate where the reserve component does better than the active component, red where the reserve component does worse, and orange where there is no difference.[1] Note that "better" could mean significantly higher or lower prevalence rates, depending on the outcome.[2] Finally, a few cells are shaded in blue. These are outcomes for which the prevalence rate in the reserve component was significantly smaller than in the active component; however, it is unclear whether this is "better." The outcomes are primarily related to use of mental health care services (e.g., total number of mental health care visits).

Health Promotion and Disease Prevention

Significantly more reserve component service members were obese and significantly fewer meet HP2020 goals for medium and high activity levels, as compared with active component service members. This could be problematic should these reservists be called upon for active-duty service. At the same time, reservists were more likely to meet HP2020 goals for strength training and got more and higher-quality sleep than their active component peers.

Substance Use

Reserve component service members reported significantly less binge and heavy drinking and fewer negative consequences caused by drinking than their active component peers. They were also less likely to view the military culture as supportive of drinking. In addition, fewer used tobacco products, including traditional and e-cigarettes, as well as smokeless tobacco. And though they were less likely to use prescription drugs than their active component peers, significantly more reservists reported using illicit drugs, especially marijuana, in both the past

[1] When interpreting ARRs and percentage changes between populations, it is important to keep in mind the base for that increase or decrease. That is, an ARR of 1.2 (or a 20-percent increase) for an outcome with a reserve component prevalence of 2 percent represents a much smaller increase in absolute value than the same ARR and percentage increase for an outcome with a reserve component prevalence of 25 percent (0.4 versus 5.0 percent). Thus, extremely large percentage increases (or decreases) across populations are often substantively small while the ARR and percentage change appear quite large.

[2] For example, significantly more reserve component service members meeting HP2020 goals for sleep would be a higher percentage than the active component and a green cell in the table, but a lower percentage on lack of energy due to poor sleep would also be a green cell in the table.

Table 11.2
Significant Differences Between the Active and Reserve Components for Select Outcomes

Health Promotion and Disease Prevention	Substance Use	Mental and Emotional Health	Physical Health and Functioning	Sexual Behavior and Health
Obesity (HP2020 goal)	Binge drinking	Past-month and past-year serious psychological distress	Physician-diagnosed chronic conditions: high blood pressure; back pain; bone, joint, or muscle injury (including arthritis)	2+ sex partners in past year
Normal weight (HP2020 goal)	Heavy drinking	Probable PTSD	Physician-diagnosed chronic conditions: diabetes, high cholesterol, asthma, angina or coronary heart disease, heart attack	New partner sex without condom use in past year
Medium activity level (HP2020 goal)	Any alcohol consequences	Any angry or aggressive behavior in past 30 days	No medical condition diagnosed in past year	Condom use during most-recent vaginal sex
High activity level (HP2020 goal)	Risky drinking and driving behavior	Unwanted sexual contact in past 12 months and since joining the military	Physical conditions: stomach or bowel problems, back pain, arm/leg/joint pain, headaches, chest pain or shortness of breath, tired or low energy	STI in past year
Strength training 3+ days per week	Any productivity loss due to drinking	Physically assaulted in past 12 months and since joining the military	Physical conditions: dizziness	No contraceptive use at most-recent sex
Less than one hour of screen time per day	Military culture supportive of drinking	Past-year gambling problem	Any bodily pain (including headache)	Used highly effective contraceptive at most-recent sex
Routine annual physical exam	Current cigarette smoker	Past-year suicidal thoughts, suicide plans, and suicide attempts	Any bodily pain (excluding headache)	Used moderately or most-effective birth control method at last sex (women 20–44 years old)
Hours of sleep (HP2020 goal)	Current e-cigarette use	Perceived unmet need for mental health services	High physical symptom severity	HIV test in past year
Very good and fairly good self-rated sleep quality	Current smokeless tobacco user	Past-year mental health care service utilization	Excellent and very good self-rated health	High risk for HIV
Moderate to severe lack of energy due to poor sleep	Any past-12-month and past-30-day drug use (including marijuana)	Total mental health visits in past year	Absenteeism	High risk for HIV tested in past year
Frequent use of medication to sleep (3+ times per week)	Any past-12-month and past-30-day drug use (excluding marijuana)	Use of medication for mental health problem in past year	Presenteeism	Unintended pregnancy in past year

Table 11.2—continued

Health Promotion and Disease Prevention	Substance Use	Mental and Emotional Health	Physical Health and Functioning	Sexual Behavior and Health
Frequent use of other caffeinated beverages (e.g., tea, coffee), OTC medications, and prescription medications to stay awake (3+ times per week)	Any prescription drug use (including stimulants, sedatives, and pain relievers)	Perceived career-related stigma associated with mental health care service utilization		Contraceptive counseling prior to deployment
	Any prescription drug misuse (including stimulants, sedatives, and pain relievers)			Able to get preferred birth control before and while deployed

NOTES: Green cells indicate that the reserve component did better than the active component on the outcome in question. Red indicates that the reserve component did worse on the outcome in question. Orange indicates no difference between the two components. Blue indicates an outcome where the reserve component prevalence rate was significantly smaller, but it is unclear whether this was a "better" outcome; these outcomes are primarily related to use of mental health care services.

30 days and the past year. When marijuana is excluded, however, there was no difference in the prevalence rates of illicit drug use between the two components.

Mental and Emotional Health

The prevalence of many mental health problems was lower among reserve component service members, including serious psychological distress, PTSD, angry and aggressive behavior, having suicidal thoughts, making suicide plans, and suicide attempts. Similarly, rates of unwanted sexual contact and physical assaults were lower among reservists. Outcomes related to mental health care service utilization were more difficult to classify because it is not clear whether increased or decreased use of services relative to the active component was positive or negative. That said, significantly fewer reservists indicated an unmet need for treatment.

Physical Health and Functional Limitations

Significantly fewer reservists than active component service members reported common chronic physical health conditions, including those diagnosed by a physician. Reservists also fared better in terms of pain (with and without headache), severe physical symptoms, self-rated health, presenteeism, and absenteeism.

Sexual Behavior and Health

Significantly fewer reserve component service members engaged in a number of risky sexual behaviors, including multiple partners in the past year, not using a condom with a new partner, and using a condom at most-recent vaginal sex. Perhaps not surprisingly, they fared better in terms of the prevalence of STIs compared with their active component peers. However, significantly more reservists did not use highly effective contraception at last sex and were not using moderately or most effective methods of birth control. With respect to HIV, significantly fewer reservists were considered at high risk, but, among those at high risk, significantly fewer had been tested than among active component service members. There were no significant

differences in the rate of unintended pregnancy in the past year, receipt of predeployment contraceptive counseling, or the ability to get one's preferred method of birth control before or during deployment.

Policy Implications and Recommendations

Force Readiness, Health and Well-Being

A central use of the HRBS is to assess the readiness of the force with respect to the health and health-related behavior of service members. Therefore, we provide observations to help DoD and the services identify immediate and future threats to health-related readiness of the reserve component (consisting of the service-specific reserves and National Guard), and we outline applicable policy implications. We direct most recommendations to DoD and the services because these departments are responsible for the reserves and National Guard. We direct recommendations to the Coast Guard separately because they fall under the Department of Homeland Security.

Health Promotion and Disease Prevention

- Not all reserve component respondents reported having an annual physical exam. Routine medical exams are used to identify asymptomatic illnesses, provide early intervention, and encourage healthy behavior (Merenstein, Daumit, and Powe, 2006). In addition, they are required for a service member (reserve or active component) to deploy. **More attention by DoD, the services, and the Coast Guard is needed to improve reserve component compliance with physical examinations.** This may require altering the process for obtaining these exams. For instance, time could be dedicated during reserve service for every unit to undergo this exam.
- Roughly 8 percent of reserve component service members reported having no health insurance of any kind. Health insurance is a complicated issue for reservists because not all qualify for the same types of insurance. Access to care through insurance has shown to result in better health outcomes and better preventive care (Schriver, 1999; Starfield, Shi, and Macinko, 2005; Freeman, Kadiyala, et al., 2008; Henry, 2014), both of which contribute to a healthy and ready fighting force. **DoD, the services, and the Coast Guard could designate a health care navigator to assist units with low health insurance compliance rates, which might increase the number of people who are insured through the public or private marketplace.**
- Nearly one-fifth of the reserve force was classified as obese, according to the CDC's BMI categories. However, whether obesity represents an actual threat to readiness remains an open question because BMI might not accurately reflect physical health and conditioning (e.g., Nevill et al., 2006). DoD is currently reviewing DoDI 1308.3, which outlines how to assess physical fitness and body fat across the military (reservists included), and the individual branches of the services have been reviewing and making changes to their own physical fitness tests. **As part of these revisions, DoD, the services, and the Coast Guard should consider whether BMI is an appropriate measure of weight for service members.**

- Less than half of reserve component service members reported getting the recommended seven or more hours of sleep per night, one-quarter rated their sleep as very bad or fairly bad, and nearly one-fifth of respondents reported being severely or moderately bothered by a lack of sleep. Difficulty sleeping and fatigue are important concerns that could impact the readiness of service members. Not only does poor sleep have downstream consequences for physical and mental health, but in the short term, both poor sleep and fatigue can also affect performance. This is especially important to consider in the context of tasks that require quick decisionmaking or sustained attention, as both can be affected by fatigue and lack of quality sleep. **DoD, the services, and the Coast Guard should base efforts to educate reserve component service members and leaders on healthy sleep requirements on successful models in analogous populations** (e.g., Hershner and O'Brien, 2018)**.**

Substance Use

- Reserve component service members reported binge drinking in the past 30 days at a rate of 29 percent, and approximately 7 percent were categorized as heavy drinkers. Nearly 5 percent reported any serious consequences from drinking, with over 6 percent reporting drinking and driving behavior and over 5 percent reporting work-related productivity loss due to drinking. One-fifth of all reserve component service members reported that military culture was supportive of drinking. **DoD, the services, and the Coast Guard might wish to promote reserve component alcohol reduction and prevention programs that change cultural beliefs about alcohol use and promote self-care.** Media campaigns and brief interventions that focus on demonstrating to groups that heavy alcohol use may be less normative than they perceive it to be within their group have been efficacious in changing drinking behavior among young adult civilians and among veterans (Lewis and Neighbors, 2006; McDevitt-Murphy et al., 2015; Pedersen et al., 2017; Yamin et al., 2019). Such interventions seek to challenge beliefs that heavy drinking is normative; by doing so, they could impact the culture of drinking in the military as individuals learn that many reserve component members drink moderately or not at all. Education for commanders emphasizing adverse organizational consequences (e.g., accidents, injuries, intimate partner violence, sexual harassment and assault) could help to shift military culture. It is also important to encourage service members to seek care if they are engaging in heavy drinking. As service members see others receiving and benefiting from care, they might be inspired to seek care for themselves. However, to facilitate the pursuit of care among reserve component service members, it will be important for the military to encourage self-referral and reduce perceived and actual penalties for doing so (e.g., ineligibility to deploy, negative impact on career progression). The Army's revised policy, which allows soldiers to voluntarily self-refer without being mandatorily enrolled in a substance abuse program, is one such example (see Army Directive 2019-12, Policy for Voluntary Alcohol-Related Behavioral Healthcare).
- Nearly one-third of reserve component service members reported using tobacco in some form, such as through use of combustible cigarettes, e-cigarettes, cigars, smokeless tobacco, pipes, or hookahs. **Reducing tobacco use in all forms should be a high priority for DoD, the services, and the Coast Guard given the long-term health consequences of use. DoD, the services, and the Coast Guard should consider ways to facilitate**

access to intervention and prevention approaches, which may include programs available on bases or in the community. Remote interventions may also be effective with this population to the extent that they are evidence-based.

- Use of drugs in the past 12 months was generally low among reserve component service members. However, approximately 3 percent reported use of any drugs, with marijuana or synthetic cannabis use reported as most prevalent. **Preventing any drug use, including marijuana and synthetic cannabis use, should be a priority for DoD, the services, and the Coast Guard given the potential for immediate and long-term effects of drug use, as well as legal complications associated with use of drugs that are illicit at the federal level.**
- **Though the rates of use of prescription stimulants, sedatives, and pain relievers was low (in an absolute sense), with just over 1 percent of service members reporting misuse of any prescription drugs in the past 12 months, DoD, the services, and the Coast Guard should monitor prescription drug availability in the military given their potential for misuse.** Moreover, pain relievers were most commonly misused—this is an outcome that should continue to be monitored, especially given that pain-related conditions were among the more prevalent physical health concerns.

Mental and Emotional Health

- Symptoms of psychological distress were common among reserve service members. Although rates of mental health problems assessed in the 2018 HRBS were consistently lower among the reserve component compared with the active component, members of the reserve component demonstrated higher rates of serious psychological distress and probable PTSD than those observed in the general population. If untreated, these symptoms could persist and lead to significant functional impairments, which have major implications for service member well-being and force readiness. DoD already invests considerable resources into surveillance of service member mental health, studying factors associated with poor mental health status, and implementing programs to help mitigate the negative impacts of mental health conditions on service member well-being. **DoD, the services, and the Coast Guard should continue their efforts to monitor, understand, and support mental health for reserve service members.**
- Although a large percentage of service members receive mental health treatment, the process of seeking care remains a barrier. Practical barriers to seeking care, such as difficulty scheduling an appointment or taking time off from one's work duties, were commonly endorsed by service members. **DoD, the services, and the Coast Guard should continue their efforts to help mitigate challenges associated with scheduling and attending appointments for mental health treatment.** Some service members who have high levels of distress do not seek care that could help them because they do not believe that they have a mental health problem or that mental health treatment will be effective. In addition, the belief that mental health treatment would harm one's military career is still widespread; despite efforts to reduce stigma associated with mental health treatment, this belief was reported by over one-third of the sample. Improving availability of mental health care alone will not address these barriers to care. **Therefore, DoD, the services, and the Coast Guard should explore the potential for enhancing the role of peers and commanders as facilitators of treatment-seeking through mental health literacy**

training and dissemination of information about mental health resources. These nonclinical facilitators of help-seeking may be important for the reserve and National Guard because care is most likely to be sought outside of the MHS. In addition, training courses in mental health first aid tailored to military service members have been developed and tested in military populations (Mohatt et al., 2017). These courses may help to increase knowledge of signs and symptoms of mental health problems, increase awareness of appropriate treatment resources, and reduce mental health stigma. Targeting commanders might be an efficient approach because of the impact that commanders can have on the climate related to mental health care in units under their command. Such programs may also hold promise for enhancing awareness and use of formal mental health services. Studies to determine the most effective ways to engage service members who may be resistant to formal mental health treatment could help improve these programs and inform the design of additional pathways to care that can be opened.

- Although specialty mental health providers were the most commonly endorsed source of mental health treatment, nearly half of mental health services were delivered by nonspecialists. **DoD, the services, and the Coast Guard should pursue additional research to identify, improve, and evaluate the sources, quality, and outcomes of nonspecialty mental health services utilized by service members.**
- Reserve component service members use mental health services in different ways than the active component and the general population. Compared with the active component, reserve component service members were more integrated into the civilian health care system, where they were most likely to receive care. Compared with the general population, they were more likely to receive specialty care when they got care for a mental health condition and less likely to receive psychiatric medications. **The distinctive pattern of care suggests that DoD, the services, and the Coast Guard should monitor access to and quality of mental health care in the reserve component.** In particular, understanding potential barriers to care among reserve component service members who are predominantly covered by private health insurance and dependent on the civilian health system for care should be a priority.
- Approximately 6 percent of all reserve service members reported suicidal ideation in the past year. Although lower than rates observed among active component service members in the 2018 HRBS, suicide ideation among reserve members is more prevalent compared with the general population (4.3 percent; Substance Abuse and Mental Health Services Administration, 2018). Women and junior enlisted service members demonstrated the highest rates of past-year suicide ideation, similar to patterns observed among active component service members in the 2018 HRBS. Efforts to target prevention strategies to these high-risk groups may be beneficial. **Despite substantial past investment to understand and prevent suicide among service members, DoD, the services, and the Coast Guard should pursue additional efforts to determine whether different prevention strategies are needed for different subgroups of reserve component service members (e.g., by level of risk, demographic or psychosocial characteristics).** There is also a need for more rigorous evaluation of suicide prevention strategies to better understand factors associated with successful implementation and effectiveness in both reserve and active components. Such data will allow the military to better tailor its prevention efforts and target its resources more effectively and efficiently.

Physical Health and Functional Limitations

- Though more than half of reserve component service members reported that their health was very good or excellent, it is notable that midcareer and senior enlisted reservists reported poorer health than junior enlisted personnel or officers. This likely reflects a combination of factors, including age but also the cumulative effect of military training exercises and the nature of military occupations held by enlisted service members. **DoD, the services, and the Coast Guard should consider policies to mitigate the adverse effects of military service on health, as this can have downstream consequences for readiness of reserve component service members.**
- Pain was a commonly reported health condition by service members, with just over one-fifth reporting some bodily pain the past 30 days. High levels of pain may be unsurprising given that musculoskeletal injuries in the military are common. Pain relievers were the most frequently misused prescription drug in the survey (though the rate was roughly 1 percent). Thus, the potential for pain to lead to misuse and abuse of prescription drugs makes it a potential area of concern for readiness. **DoD, the services, and the Coast Guard should place continued policy and program attention on both preventing pain (e.g., reducing musculoskeletal and overuse injuries, reducing training injuries) and promoting pharmacologic and nonpharmacologic treatment approaches (e.g., behavioral interventions, such as cognitive behavioral therapy; complementary and alternative modalities).**

Sexual Behavior and Health

- **DoD, the services, and the Coast Guard should consider ways to increase the proportion of personnel who receive predeployment contraceptive counseling.** The 2016 NDAA required DoD to "establish and disseminate clinical practice guidelines on standards of care" for contraceptive counseling and to provide comprehensive counseling (*National Defense Authorization Act for Fiscal Year 2016*, 2015). DoD adopted these guidelines at the end of 2016 with the publication of DHA-IPM 16-003. They were fully codified in May 2019 with DHA-PI 6200.02. The guidelines apply to men and women and specifically include predeployment counseling and a requirement to provide access to the full range of current contraceptive methods. We expect that progress will be observed as providers become more familiar with these new guidelines. Although we cannot be certain why few reserve component service members reported receiving counseling, it is possible that many service members and providers saw the counseling as less relevant to their situations. Educational efforts should make clear to both MHS providers and service members that directives to provide contraceptive counseling are relevant for all personnel, including those who are not currently sexually active or do not intend to be during deployment, those who identify as LGB, and those who intend to have children in the near future. Sexual activity may be unplanned; hormonal contraceptives can be used for reasons other than birth control (including to suppress menstruation in the deployed environment); and long-acting methods of contraception, such as IUDs and implants, are reversible (i.e., when they are removed, fertility is typically reinstated in about one month). These efforts might include informational campaigns directed at health care providers and service members and/or the promotion of the use of digital apps and infor-

mational websites designed to assist both providers and patients with contraceptive decisionmaking.

- **DoD, the services, and the Coast Guard should consider expanding efforts to provide contraceptive counseling specifically to men.** U.S. population data available from the 2006–2010 National Survey of Family Growth indicate that 60 percent of men could benefit from family planning services (with the highest need among men aged 20 to 29), but only 10 percent reported receiving counseling about contraception (Marcell et al., 2016). Research is ongoing to develop effective contraceptive counseling strategies that target men. Such strategies include counseling men on condom use and how to support their partners in using other methods, such as IUDs, as well as providing counseling services to couples.
- **DoD, the services, and the Coast Guard should increase the consistent and effective use of contraception through improved education about contraceptives.** Under the new contraceptive guidelines adapted by DoD, IUDs and implants are to be considered first-line methods of contraception. However, providers and service members might need additional training and education about the benefits of the most-effective contraceptive methods, with the caveat that these methods might not be appropriate for all women. Thus, it is also important that service members receive enhanced educational support on consistent and correct use of whatever method they choose. This might occur at MHS clinics, in trainings, or through websites and digital apps.
- **To prevent STIs and unintended pregnancies, DoD, the services, and the Coast Guard should also ensure that condoms are easily available through TRICARE and available to reserve component members at no or reduced cost.** Evidence from school-based condom availability programs indicates that these programs result in increased use of condoms and decreased rates of STIs without promoting sexual activity or increasing numbers of sex partners (Algur et al., 2019; Scott-Sheldon et al., 2011). **DoD, the services, and the Coast Guard should also consider implementing regular testing for STIs, especially among women.** Women in the reserve component were significantly more likely to report a past-year STI than men, and there are links between untreated chlamydia and infertility among women (Haggerty et al., 2010; Hafner, 2015). The CDC recommends annual testing for sexually active women under age 25, women with new or multiple partners, and sexually active gay and bisexual men (gay and bisexual men could benefit from testing as often as every three or every six months if they have multiple sex partners) (CDC, 2019b).
- **DoD, the services, and the Coast Guard should increase annual testing for HIV infection among those at high risk through better PHA screening for risk.** Although the current Form 3024 asks pertinent questions, it is not clear that information on various contributors to risk is combined to detect those in the highest risk category, nor is it clear that certain risks (e.g., MSM) or combinations of risks should consistently trigger more frequent (annual or biannual) testing for HIV infection.

Sexual Orientation and Health

- **DoD, the services, and the Coast Guard should broadly target health promotion efforts to include LGB-specific considerations, as appropriate, recognizing that LGB individuals are part of the service.** Addressing LGB health disparities is unlikely

to require the development of programs or policies targeted specifically to this group, with only a few exceptions. Indeed, making salient the higher rates of mental and sexual health issues among LGB personnel could increase the stigma of LGB status, strengthening the likely source of many of these disparities: minority stress (see Meyer, 2003).

- **DoD, the services, and the Coast Guard should address the unique mental health needs of LGB personnel.** Current and future campaigns to reduce stigma surrounding mental health and service utilization should include messaging and images relevant to LGB personnel (e.g., feeling isolated, lack of acceptance) and should be tested for acceptability and perceived effectiveness in this subgroup of service members prior to implementation. Mental health service providers should also be sensitive to the unique needs of LGB service members.
- **DoD, the services, and the Coast Guard could reduce sexual health disparities, including the high rates of STI and HIV risk behavior, through education of providers in the MHS.** It is unclear whether MHS providers are aware of the high percentage of LGB personnel identifying as bisexual. Roughly half (53 percent) of LGB reserve component service members are bisexual. Incorrect assumptions that bisexual service members are heterosexual, gay, or lesbian based on the sex of their current sexual partners could lead to incomplete or incorrect counseling regarding use of condoms and other contraceptives and testing for STIs. Providers of women's health services should be aware that more than one in seven of the reserve component servicewomen they see identify as LGB. Adaptation of patient screening and counseling protocols and clinic forms might also be appropriate to recognize the presence of LGB personnel as part of the patient mix.
- Percentages of LGB service members smoking traditional cigarettes and using e-cigarettes are of particular concern, with roughly one in five LGB service members engaging in these behaviors. **DoD, the services, and the Coast Guard should consider targeted screening and intervention to assist with smoking cessation among LGB reserve members as part of standard care for those who report LGB identity during routine health care visits when activated or during required annual physical assessments.** Though provider access to reserve and Guard members in a clinical setting is limited given their more restricted use of the MHS, it is important to highlight the consequences of such negative health behaviors when contact with these individuals is made.

Future Iterations of the HRBS

The HRBS has a long history within DoD, and with that history has come many changes to both survey content and survey implementation. The 2018 HRBS represents the fourth consecutive iteration to rely solely on an internet administration. Over that same period, response rates have also declined. Below, we offer some recommendations for future iterations of the HRBS, focusing on ways to improve the efficiency and effectiveness of data collection.

Consider the use of survey incentives. The general consensus among those who study survey implementation is that there is a positive association between incentives and response rates (Singer and Ye, 2013). Mercer and colleagues' meta-analysis found that prepaid incentives, rather than promised incentives that are received only after survey completion, had the highest return on investment, especially on mail surveys (Mercer et al., 2015). Notably absent from their analysis, however, are internet surveys. An older review of the literature found that providing monetary incentives for web surveys increased an individual's odds of response by

50 percent (Edwards et al., 2009).[3] Using a college student sample, Parsons and Manierre also found that prepaid incentive of a $2 bill was associated with increased response rates (Parsons and Manierre, 2014). Overall, there is no consensus on the size of an optimal incentive, regardless of whether it is given before or after participation. Nonetheless, experimental research has shown that a small pre-incentive can improve response rates (Sánchez-Fernández et al., 2010; Singer, Van Hoewyk, and Maher, 2000).

Whether such incentives could improve response rates, and thus reduce the possible nonresponse bias, among reserve component service members is an open question.[4] The HRBS could be used to answer this question. According to DoDI 3216.02, it is possible for a federal contractor to compensate service members, who are considered federal employees, for participation in a survey. The Instruction is vague as to whether this includes pre- and post-incentives. Furthermore, approval is not automatic, as a DoD IRB and Office of General Counsel must approve the payment. Perhaps more importantly, service members who do receive compensation must be advised that they can accept compensation if they complete the survey only *outside* of duty time. This requirement could have unintended consequences, as our data show that roughly two-thirds (65.4 percent) of respondents completed the 2018 HRBS between the hours of 7 a.m. and 6 p.m., Monday through Friday. In addition, special considerations might be needed for reserve component service members who do not have regular access to a DoD computer or who do not regularly check their DoD email address. Nonetheless, the next iteration of the HRBS should explore the use of targeted incentives, especially prepaid incentives that are not dependent on survey completion, to increase participation among certain groups with traditionally low response rates (e.g., junior enlisted personnel).

Shorten the survey and focus survey content. Though the 2018 HRBS was somewhat shorter than the 2015 version (measured in terms of time to completion), it is still a lengthy survey that can become tedious for the respondents, especially if they have recently answered similar survey items in other service-specific or DoD-wide surveys. Survey fatigue is a continued problem among service members, especially when it comes to health and health-behavior topics. Service members are required to complete the annual PHA (Defense Health Agency, 2016; Office of the Under Secretary of Defense for Personnel and Readiness, 2016). The PHA has three pieces, one of which is a service member survey.[5] Some, though not all, of the content in the survey overlaps with topics covered in the HRBS (e.g., chronic conditions, mental health, alcohol use). DoD should consider whether this duplication is necessary. On the one hand, overlapping surveys could be driving down response rates on the HRBS. On the other hand, the PHA is not anonymous or confidential; responses become part of the medical record and are directly tied to service members because those responses are intended to formulate a treatment or care plan for those service members who are having an issue. This could incentivize service members not to be entirely truthful if they feel that their response could potentially result in negative career-related consequences. As a first step, DoD should explore whether and how responses to the similar items differ across the PHA and the HRBS.

---

[3] Note that this does *not* mean that overall response rates increased by 50 percent.

[4] At least one experimental study of recent U.S veterans found that a $5 pre-incentive improved response rates by 52 percent (Coughlin et al., 2011).

[5] The other two pieces are an in-person interview with a health care provider and a record review of the service member's health care record.

An alternative approach to reducing survey content could involve the use of modules. Modules would be based on content—for example, a tobacco use module or a pain and musculoskeletal injury module. In this approach, not every service member would receive every set of items on the survey but instead could be randomly (or purposively) assigned to receive a certain number or type of modules. Modules that address high-frequency topics might not need as many respondents as modules related to topics that occur with a much lower prevalence (e.g., drug use). And the same set of modules might not need to be asked at every iteration of the HRBS, especially if trend data suggest little change over time. A module approach would also allow for certain period-specific topics to receive dedicated space on the survey. If there were congressional or DoD interest in a particular topic during a particular survey year, it could be addressed through the use of a "one-time only" module.

Explore the use of a service member panel for tracking risky behaviors over time. Finally, as a supplement to the HRBS, DoD should consider the use of a service member panel to gather information about certain health outcomes and health-related behaviors on a real-time basis. Panels are groups of individuals who agree to participate in a series of surveys for a period of time (e.g., six months, a year) and are replenished at regular intervals as old members leave. Panels do require constant maintenance to make sure that they remain representative of some underlying population of interest. Furthermore, panels are generally not efficient when it comes to assessing the population prevalence of rare outcomes. Thus, a panel should be considered as a supplement, not a wholesale replacement, of the HRBS. However, the use of a panel could be beneficial in terms of reducing the overall scope of the HRBS, which may positively impact response rates. In addition, a panel could be an attractive option because surveys would not necessarily have to be limited to health-related topics and could be used to study any number of topics that could impact retention or readiness.

Conclusion

The HRBS is used by DoD, the Coast Guard, and the reserve component to assess the current health and well-being of the force and to identify possible threats to readiness. This report provided an overview of health outcomes and health-related behaviors across seven domains. The future of this study may face future challenges—declining response rates, overlapping content with other surveys, and competition for resources—but it remains an important source of data for tracking trends, informing policy, and making programmatic decisions.

APPENDIX A

2018 DoD Health Related Behaviors Survey

This appendix presents the survey as it was programmed for respondents to view on the internet. Text in brackets and italics refers to instructions for the survey programmers and was not seen by respondents.

[PROGRAMMING INSTRUCTIONS: PLEASE INCLUDE DATE AND TIME STAMPS FOR START AND END.]

[INCLUDE BOTH RAND AND WESTAT LOGO ON WEB SURVEY]
[INTRO SCREEN 1]

RCS # DD-HA(BE)2189

Expires: 02/28/2023

Welcome to the 2018 DoD Health Related Behaviors Survey (HRBS). Participation in the study is by invitation only. To participate in this study, login below with the unique ID code provided in your email or postal letter invitation.

Please enter your unique ID code to begin.

For more information on the 2018 DoD HRBS, please visit http://www.health.mil/2018HRBS

RCS # DD-HA(BE)2189

Expires: 02/28/2023

Welcome to the 2018 DoD Health Related Behaviors Survey

Dear Service Member:

Before you begin this web survey, please read the Privacy Advisory and informed consent statement that follows. Click the Frequently Asked Questions (FAQs) button at the bottom of this page if you want to read more details about the study.

PRIVACY ADVISORY

This survey is confidential. The Defense Manpower Data Center has provided certain information about you to allow the RAND Corporation and Westat to conduct this survey. Your name and contact information have been used to send you email and mail notifications about the survey. Only RAND and Westat will know who participated in the study or who did not. The data that RAND and Westat provide to DoD will be a reduced set of responses, treated in such a way as to make it difficult for DoD to identify any participant from his or her pattern of responses. Study staff have been trained to protect your individual survey responses and are subject to civil penalties for violating your confidentiality. DoD has agreed to these conditions to protect your privacy. To reduce the length of the survey, RAND will also collect demographic information about you such as your service branch, pay grade, age, and education level from the Defense Manpower Data Center and link it to your survey responses.

INFORMED CONSENT STATEMENT

Introduction: You are being asked to complete a confidential and voluntary DoD-approved survey. This survey is for research purposes.

Survey Contractors: DoD has contracted with the RAND Corporation and Westat to conduct the 2018 DoD Health Related Behaviors Survey. RAND is a private, nonprofit organization that conducts research and analysis to help improve public policy and decision-making. RAND's data collection contractor is Westat, an internationally known research and statistical survey organization. Westat manages the technical aspects of the web survey operations and can help you with any computer or technical problems.

Purpose: The purpose of this survey is to provide an assessment of the health-related behaviors and lifestyles of military personnel that have the potential to impact readiness. The information will be used in scientific research to inform DoD of potential health problems in the military and help suggest ways to solve or prevent them. DoD and the Services use the results from this survey to inform policies and programs to optimize individual and overall health status and fitness.

Selection: You were selected at random from a computer-generated list of all Active Duty, Reserve Component, National Guard, and Coast Guard personnel worldwide to represent your Service branch and component in this important research.

Length: This web survey will take approximately 20-25 minutes to complete.

Voluntary Participation: Your participation in this survey is voluntary. No negative action will be taken against you should you choose not to take part in the survey. You may skip questions you do not wish to answer and can stop participating in the survey at any point.

Confidentiality: Because of the sensitive nature of the information in the survey, RAND has taken several steps to allow your frank and honest responses. First, the survey is confidential. Only RAND and Westat will have identifying information about you. DoD, the Services, and your command will not know who did and did not complete the survey. Second, personal identifying information will not be linked to survey data. This means that all data obtained by RAND through DMDC, as well as data collected by Westat, will be linked using scrambled ID numbers, rather than actual names or social security numbers. The matching file that connects any individual to his or her data may only be accessed by individuals who work with the data and who have been trained to handle potentially sensitive data. Third, all data transfers between RAND and Westat will use an encryption program designed for the purpose of transferring potentially sensitive information. Fourth, both RAND and Westat have physical security measures in place to prevent unauthorized individuals from accessing hard copies of data as well as accessing computing resources where electronic data is stored. Finally, the information you provide will be combined with that from other military personnel to prepare statistical reports. At no time will your individual identifiable survey data be given to anyone outside the study team.

To help us protect your privacy, we have obtained a **Certificate of Confidentiality** from the National Institutes of Health. The researchers can use this Certificate to legally refuse to disclose information that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings, for example, if there is a court subpoena. The researchers will use the Certificate to resist any demands for information that would identify you.

Risks of Participation: Breach of confidentiality is a possible risk. However, as noted above, RAND and Westat have taken a number of steps to ensure the confidentiality of the data you provide.

Some of the questions asked are sensitive in nature. The survey asks about a range of health issues, such as physical and mental health, substance use, sexual practices, stress, deployment related health and combat exposure. You may feel discomfort or distress in answering one or more of these items. Therefore, we encourage you to take the survey in private, where others will not see your computer screen.

It is okay to forward the survey link to a personal email address and you may complete the survey from a non-government, non-CAC enabled computer. You may also take the survey on a smartphone or tablet.

[FREQUENTLY ASKED QUESTIONS] (hyperlink)

RCS # DD-HA(BE)2189

Expires: 02/28/2023

FREQUENTLY ASKED QUESTIONS (FAQs)

What is the purpose of the 2018 DoD Health Related Behaviors Survey (HRBS)? This survey assesses the health related behaviors and lifestyles of military personnel that have the potential to impact readiness. Results will be used to monitor service members' needs, develop policies, and improve health programs and services for military members and their families.

How long is the survey? This survey takes about 20-25 minutes.

Who is doing this study? The Department of Defense (DoD) asked the RAND Corporation and its data collection contractor, Westat, to conduct an independent, objective assessment of Service members' health status and health related behaviors.

Who is the RAND Corporation? RAND is a private, nonprofit organization that conducts research and analysis to help improve public policy and decision-making. For more information about RAND see: https://www.rand.org/

Who is Westat? Westat is an internationally known research and statistical survey organization. Westat manages the technical aspects of the web survey operations and can help you with any computer or technical problems. For more information about Westat see: https://www.westat.com/

Why did you pick me? You were randomly selected from all Active and Reserve Component and Coast Guard personnel to represent your Service branch in this important research.

How did you get my name? We obtained your name and basic demographic information (e.g., service branch, pay grade, age, education level) from the Defense Manpower Data Center [DMDC], which maintains DoD personnel records. Because we are doing an official, approved DoD survey, DMDC was authorized to give us military members' names and contact information for research purposes only. We are just using your name to send you information about the survey via email and mail. Only study staff will be able to link your survey responses to your contact information via a unique survey ID code. The survey is confidential.

How will the survey findings be used? RAND will report survey findings in a way that does not identify individuals to the Services, DoD, or the public. The information you provide will be combined with that from other military personnel to prepare statistical reports. At no time will your individual data be reported.

Why should I participate? This is your chance to be heard on issues that directly affect the health, well-being, and readiness of military members and their families. The survey results will help inform DoD of potential health problems in the military and help suggest ways to solve or prevent them.

Will my answers be kept private? Yes. As noted earlier, this survey is confidential. This means that RAND and Westat will not give DoD information about who participated in the study, or provide your responses to them in a way that can identify you. DoD has agreed to this condition to protect your privacy.

Can I complete the survey during duty hours / on a government computer? Yes. The Service Chiefs endorsement letters posted on the survey website indicate that you can use a computer at work to do the survey. You may also use a smartphone or tablet to complete the survey.

What do I do if I experience any discomfort or distress from filling out the survey? Some questions on the survey are sensitive in nature and it is possible that you may feel discomfort in answering one or more of these items. If you are having any suicidal thoughts, please seek help immediately. We encourage you to contact your unit's chaplain or a mental health professional. Other resources can be found below:

Military OneSource (http://www.militaryonesource.mil) is a free 24 hour service that is available 7 days a week to provide a full range of services, across the deployment cycle, to military personnel and their families, at no cost. They can be reached at:

Stateside: CONUS: 1-800-342-9647
Overseas: OCONUS Universal Free Phone: 800-342-6477 or 703-253-7500
Collect from Overseas: OCONUS Collect: 703-253-7599
En Español llame al: 800-342-9647
TTY/TDD: Dial 711 and give the toll-free number 800-342-9647

DoD Safe Helpline (https://www.safehelpline.org/) provides worldwide live, confidential support, 24/7. You can initiate a report and search for your nearest Sexual Assault Response Coordinator (SARC). You can find links to Service-specific reporting resources and access information about the prevention of and response to sexual assault on their website or by calling the hotline at 1-877-995-5247.

Military Crisis Line (http://veteranscrisisline.net/ActiveDuty.aspx) can also provide confidential support and consultation if you feel distressed. They can be reached at 1-800-273-8255 (then press 1). Or send a text to 838255

You may also contact the **National Suicide Hotline** at 1-800-273-TALK (8255) or https://suicidepreventionlifeline.org/.

Do I have to take the survey? The survey is entirely voluntary. If you choose to take the survey, you may stop at any time.

Did I already answer these questions in earlier DoD surveys? Some Service members may have completed surveys like this one in the past. This survey is conducted approximately every three years to get a comprehensive update about the health behaviors of military members. Since DoD wants to understand trends in members' experiences in the Services, it is important that you participate in the 2018 Survey to tell us about your current health.

Who do I contact if I have questions or concerns about the survey?

- **Call the Westat Survey Helpdesk for computer, technical, or survey questions:** by phone toll free at 1-844-727-2018 or by email at support@dodhrbs.com
- **Contact RAND for questions about the overall study**: Email: 2018HRBS@rand.org
- **Questions about your rights as a participant in this study**: Contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. If possible, when you contact the Committee, please reference Study #2017-0459.

What do I need to do to fill out the web survey? You should go to the following website link: https://www.dodhrbs.com. If you have problems accessing the website, contact the Westat survey helpdesk listed above.

Do I have to complete the web survey in one sitting? You may use the weblink above and your unique identification code to re-start the survey wherever you stop at a time that is more convenient for you.

Will I ever see the results of the survey? Yes. When the survey results are available, an executive summary will be available.

[INTRO SCREEN 2]
[HELP button should also be programmed on each page of the survey taking respondents to a page that contains the info on this screen.]

Help
In the event that any of the questions in the survey may cause you discomfort, please remember that the following resources are available to you. You can also click on HELP at the bottom of each page for these resources.

Military OneSource (http://www.militaryonesource.mil) is a free 24 hour service that is available 7 days a week to provide a full range of services, across the deployment cycle, to military personnel and their families, at no cost. They can be reached at:

Stateside: CONUS: 1-800-342-9647
Overseas: OCONUS Universal Free Phone: 800-342-9647
Collect from Overseas: OCONUS Collect: 703-253-7599
En Español llame al: 800-342-9647
TTY/TDD: Dial 711 and give the toll-free number 800-342-9647

The **DoD Safe Helpline** (https://www.safehelpline.org/) provides worldwide live, confidential support, 24/7. You can initiate a report and search for your nearest Sexual Assault Response Coordinator (SARC). You can find links to Service-specific reporting resources and access information about the prevention of and response to sexual assault on their website or by calling the hotline at 1-877-995-5247.

The **Military Crisis Line** (http://veteranscrisisline.net/ActiveDuty.aspx) can also provide confidential support and consultation if you feel distressed. They can be reached at 1-800-273-8255 (then press 1). Or send a text to 838255.

You may also contact the **National Suicide Hotline** at 1-800-273-TALK (8255) or https://suicidepreventionlifeline.org/.

[INTRO SCREEN 3]

Who do you contact if you have questions or concerns about the survey?

- **Questions about computer, technical, or survey problems**: Please contact the Westat Survey Help Desk toll free at 1-844-727-2018 or email support@dodhrbs.com

- **Questions about the overall study or RAND**: Contact the RAND team by email at 2018HRBS@rand.org.

- **Questions about your rights as a participant in this study**: Contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. If possible, when you contact the Committee, please reference Study #2017-0459.

- **Questions about the licensing of the survey:** Information about DoD surveys can be found at http://www.dtic.mil/whs/directives/collections/index.html; this survey's RCS # is DD-HA(BE)2189 and the expiration date is 02/28/2023.

You can print a copy of this Informed Consent Statement by clicking the following button:

INFORMED CONSENT [hyperlink]

Click the Next button if you agree to participate in the survey.

NEXT [hyperlink]

[SURVEY START SCREEN]
[SURVEY INSTRUCTIONS button should be programmed at bottom of each page with this information]

Survey Instructions

- If you prefer not to answer a specific question for any reason, just leave it blank.
- If you have selected a response and then want to change it, just click on another response. If you want to clear a response, you can double-click the response to remove it.
- Use the navigation button (Next; Previous) to move to the next question. Please do NOT use your browser's forward and back buttons.
- If you need to leave the survey at any time, please select the "Save and continue later" button on the survey screen. To pick up where you left off, you may click on the link below or go to the survey website and re-enter your unique survey code.

Remember, the survey is confidential. No one in the military will be able to match your answers back to your name or other identifying information.

START SURVEY NOW

[GENERAL SKIP PROGRAMMING INSTRUCTIONS:

If a respondent skips an item, show screen with "You did not provide a response to this question. Please select a response below. Note that skipped items may result in you being asked questions later in the survey that do not apply to you."

If respondent again selects the forward option, skip the item.

General Rule: Show all items that require a fill if the fill item is skipped.]

DEMOGRAPHICS IDENTIFIED THROUGH DMDC: Service branch, component, current Reserve/Guard status, YOS (both Active and R/G), pay grade, education level, race, ethnicity, gender, age, and number of dependent children.

DMDC VARIABLES USED IN SURVEY:
CURRENT RESERVE/GUARD STATUS

SERVICE BRANCH

SKIPS AND PROGRAMMING INFORMATION IN RED
VARIABLE NAMES IN BLUE
RESPONSE VALUES IN GREEN

Q1. Which of the following best describes where you currently live? Select one response. Q1

Dorms/Barracks **1**
Military housing (including privatized), ON main base/installation **2**
Military housing (including privatized), OFF main base/installation **3**
Civilian housing that you own or pay mortgage on **4**
Civilian housing that you rent, off base **5**
Some other living situation (e.g., living with parents, temporary housing) **6**

Q2. What is your current marital status? Select one response. Q2

Married **[Skip to Q4]** **1**
Separated **2**
Divorced **3**
Widowed **4**
Never married **5**

[IF Q2 = MISSING, CONTINUE TO Q3]

Q3. Are you currently living or cohabiting with a partner? Q3

Yes **1**
No **2**

Q4. Are you male or female? Select one response. Q4

Male **1**
Female **2**
Other **3**

IF NOT RESERVE COMPONENT OR NATIONAL GUARD SKIP TO Q9.

Q5. What is your current work status? Select one response. [Ask only if Reserve Component or National Guard.] Q5

Working full-time; that is, 35 or more hours per week in one or more jobs; including self-employment **1 [Skip to Q7]**
Working part-time (less than 35 hours per week) **2 [Skip to Q7]**
I do not currently have a job **3**

[IF Q5 = MISSING, SKIP TO Q7]

Q6. What is the reason why you do not currently have a job? Select one response. [Ask only if Reserve Component or National Guard and Q5 = 3 (I do not currently have a job).] Q6

Full-time homemaker/parent **1**
Full-time student **2**
Retired **3**
Disabled **4**
Looking for work, but unemployed **5**
Not looking for work in a job **6**
Other **7**

Q7. Are you currently covered by any type of health insurance plan? [Ask only if Reserve Component or National Guard.] Q7

Yes **1**
No **2 [Skip to Q9]**

[IF Q7 = MISSING, CONTINUE TO Q8]

Q8. Are you currently covered by any of the following health insurance plans? [Ask only if Reserve Component or National Guard.]

	Yes 1	No 2
TRICARE or other military health insurance Q8A		
Veterans Affairs (VA), including CHAMPVA Q8B		
Private insurance through an employer, union, or school or purchased directly through an insurance company or exchange/marketplace Q8C		
A government insurance program provided to lower income individuals and families, such as Medicaid Q8D		

Q9. How tall are you without shoes on? Please type in your height in feet and inches.

Q9A: Feet: _____ **(1 digit; 4–7) Q9A**
Q9B: Inches: _____ **(2 digits; 0–11) Q9B**

[Soft check: Q9A < 5 and Q9B <= 0 and Male; Q9A <= 4 and Q9B < 6 and Female; Q9A <= 4 and Q9B < 6 and gender missing or other.) Q9-Height: "You entered __ feet __ inches. If this is correct, please hit NEXT below to continue. If this is not correct, please change your answer below."**]**

Q10. How much do you weigh without shoes on? Please type your weight in pounds.
(**IF FEMALE SHOW:** If you are currently pregnant, what was your typical weight before pregnancy?) Please type in your weight in pounds.

Pounds: _____ **(3 digits; 0–500) Q10**

[Soft check: Q10 < 95 AND Q10 > 275 and Male; Q10 < 95 and Q10 > 200 and Female; Q10 < 95 or > 275 and gender missing or other.) Q10-Weight: "You entered __ pounds. If this is correct, please hit NEXT below to continue. If this is not correct, please change your answer below."**]**

Q11. During the PAST 30 DAYS, how often did you do the following kinds of physical activity?

	About every day 1	5-6 days a week 2	3-4 days a week 3	1-2 days a week 4	Less than 1 day a week 5	Not at all in the past 30 days 6
Moderate Physical Activity—exertion that raises heart rate and breathing, but you should be able to carry on a conversation comfortably during the activity Q11A						
Vigorous Physical Activity—exertion that is high enough that you would find it difficult to carry on a conversation during the activity Q11B						
Strength Training—including using weights or resistance training to increase muscle strength Q11C						

Q12. During the PAST 30 DAYS, on the days you did the following, how long PER DAY did you typically do each?

[Items in Q12 should show only if the parallel item in Q11 = 1, 2, 3, 4, or 5 (any response other than not at all in the past 30 days).]

	60 or more minutes 1	30 to 59 minutes 2	20 to 29 minutes 3	Less than 20 minutes 4
Moderate Physical Activity—exertion that raises heart rate and breathing, but you should be able to carry on a conversation comfortably during the activity Q12A				
Vigorous Physical Activity—exertion that is high enough that you would find it difficult to carry on a conversation during the activity Q12B				
Strength Training—including using weights or resistance training to increase muscle strength Q12C				

Q13. Over the PAST 30 DAYS, on average, how many HOURS PER DAY did you spend using a device with a screen for activities OTHER THAN FOR WORK OR SCHOOL? Include use of a desktop or laptop computer, television, smartphone, tablet (e.g., iPad, Kindle) or other handheld device or gaming system. Select one response. Q13

None **1**
Less than 1 hour **2**
1-2 hours **3**
3-4 hours **4**
5-10 hours **5**
11 hours or more **6**

Q14. Now you will be asked about certain medical conditions. In the PAST 12 MONTHS has a doctor or other health professional told you that you had...?

	Yes 1	No 2
High blood pressure Q14A		
High blood sugar or diabetes Q14B		
High cholesterol Q14C		
Asthma Q14D		
Angina or coronary heart disease Q14E		
Heart attack, also called myocardial infarction Q14F		
Back pain Q14G		
Bone, joint, or muscle injury or condition (including arthritis) Q14H		

Q15. Would you say your overall physical health is… Q15

Excellent **1**
Very good **2**
Good **3**
Fair **4**
Poor **5**

Q16. During the PAST 30 DAYS, how much have you been bothered by any of the following problems? (Randomize.)

	Not bothered at all 1	Bothered a little bit 2	Bothered a lot 3
Stomach or bowel problems Q16A			
Back pain Q16B			
Pain in your arms, legs, or joints Q16C			
Headaches Q16D			
Chest pain or shortness of breath Q16E			
Dizziness Q16F			
Feeling tired or having low energy Q16G			
Trouble sleeping Q16H			

Q17. Have you visited a doctor for a routine check-up within the PAST 12 MONTHS? A routine check-up is a general physical exam, not an exam for a specific injury, illness, or condition. Q17

Yes **1**
No **2 [Skip to Q19]**

[IF Q17 = MISSING, SKIP TO Q19]

Q18. During that visit, did you and a care provider talk about the pros and cons of using various birth control methods? [Ask only if Q17 = Yes (1).] Q18

Yes, and the care provider was PART OF the Military Health System **1**
Yes, and the care provider was from OUTSIDE the Military Health System **2**
No **3**

Q19. Please indicate whether you agree or disagree with each of the following statements. [Ask of all respondents.]

	Agree 1	Disagree 2
It's hard to "fit in" in my command if you don't drink. Q19A		
Drinking is part of being in my unit. Q19B		
At parties or social functions at this installation, everyone is encouraged to drink. Q19C		
Leadership is tolerant of off-duty alcohol intoxication or drunkenness. Q19D		

Q20. These next questions are about drinks of alcoholic beverages. Throughout these questions, by a "drink," we mean a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor, or a mixed drink with liquor in it. We are not asking about times when you only had a sip or two from a drink.

In the PAST 12 MONTHS, have you had a drink of any type of alcoholic beverage? Q20

Yes **1**
No **2 [Skip to Q22b]**

[IF Q20 = MISSING, CONTINUE TO Q21]

Q21. Here are some things that might happen to people while or after drinking, or because of using alcohol. In the PAST 12 MONTHS did any of the following happen to you? Remember, the survey is completely confidential. [Randomize.]

	Yes 1	No 2
I found it harder to handle my problems because of drinking. Q21A		
I received military punishment (e.g., Court Martial, Article 15, Captain's Mast, Office Hours, Letter of Reprimand, etc.) because of my drinking. Q21B		
I was arrested for a drinking incident not related to driving. Q21C		
I got a lower score on my efficiency report or performance rating because of my drinking. Q21D		
I hit my spouse/significant other after having too much to drink. Q201E		
I got into a fight where I hit someone other than a member of my family when I was drinking. Q21F		
I did something sexually that I regretted. Q21G		
I was arrested for driving under the influence of alcohol. Q21H		
I was hurt in an accident because of my drinking (e.g., vehicle, work, other). Q21I		
My drinking caused an accident where someone else was hurt or property was damaged. Q21J		

Q22. In the PAST 12 MONTHS did any of the following happen to you?

	Yes 1	No 2
I drove a car or other vehicle when I had too much to drink. Q22A		
I rode in a car or other vehicle driven by someone who had too much to drink. Q22B [Asked of all respondents even if they have not had alcohol in past 12 months. After responding to this item if Q20 =2 (No) skip to Q27]		

[IF Q20 = MISSING, CONTINUE TO Q23]

Q23. In the PAST 12 MONTHS, did any of the following things happen to you? [Randomize.]

	Yes 1	No 2
I was hurt in an on-the-job accident because of my drinking. Q23A		
I was late for work or left work early because of drinking, a hangover, or an illness caused by drinking. Q23B		
I did not come to work at all because of a hangover, an illness, or a personal accident caused by drinking. Q23C		
I worked below my normal level of performance because of drinking, a hangover, or an illness caused by drinking. Q23D		
I was drunk while working. Q23E		
I was called in during off-duty hours and reported to work feeling drunk. Q23F		

Q24. Think specifically about the PAST 30 DAYS, up to and including today. In the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?

_____ **(2 digits; 0–30) Q24**

[If 0 (no drinking in the past 30 days), skip to Q27.]

Q25. On the day or days that you drank in the PAST 30 DAYS, how many drinks did you usually have each day? Count as a drink a can or bottle of beer; a wine cooler or a glass of wine, champagne, or sherry; a shot of liquor; or a mixed drink or cocktail. Q25

_____ **(2 digits; 1–90)**

Q26. During the PAST 30 DAYS, on how many days did you have (If male or other (Q4 = 1 OR 3 OR MISSING), insert "5"; if female (Q4 = 2), insert "4") or more drinks of beer, wine, or liquor on the same occasion? Select one response. Q26

About every day **1**
5 to 6 days a week **2**
3 to 4 days a week **3**
1 to 2 days a week **4**
2 to 3 days in the past 30 days **5**
1 day in the past 30 days **6**
Not at all in the past 30 days **7**

Q27. Next we would like to ask you some questions about your own use of cigarettes and other tobacco products. Please DO NOT INCLUDE electronic cigarettes or e-cigarettes in your answers, unless we specifically ask you about them.

Have you smoked at least one full cigarette in the PAST 12 MONTHS? Q27

Yes **1**
No **2 [Skip to Q31]**

[IF Q27 = MISSING, CONTINUE TO Q28]

Q28. On how many of the PAST 30 DAYS did you smoke a cigarette?

Number of Days: _____ **(2 digits; 0–30) Q28**

[If Q28 = 0 (no cigarettes in the past 30 days), skip to Q31.]

Q29. On average, on the days that you smoked in the PAST 30 DAYS, how many cigarettes did you smoke a day?

_____ **(2 digits; 0–99) Q29**

Q30. During the PAST 12 MONTHS, have you stopped smoking for more than one day BECAUSE YOU WERE TRYING TO QUIT SMOKING? Select one response. Q30

Yes, 1 time **1**
Yes, 2 or more times **2**
No **3**

Q31. In the PAST 12 MONTHS have you used chewing tobacco or snuff? Q31

Yes **1**
No **2 [Skip to Q33]**

[IF Q31 = MISSING, CONTINUE TO Q32]

Q32. During the PAST 30 DAYS, on how many days did you use chewing tobacco or snuff?

_____ **(2 digits; 0–30) Q32**

Q33. In the PAST 12 MONTHS have you smoked cigars, cigarillos, or little cigars, even one or two puffs? Q33

Yes **1**
No **2 [Skip to Q35]**

[IF Q33 = MISSING, CONTINUE TO Q34]

Q34. During the PAST 30 DAYS, on how many days did you smoke cigars, cigarillos, or little cigars?

_____ **(2 digits; 0–30) Q34**

Q35. In the PAST 12 MONTHS have you smoked tobacco in a pipe or hookah, even one or two puffs? Q35

Yes **1**
No **2 [Skip to Q37]**

[IF Q35 = MISSING, CONTINUE TO Q36]

Q36. During the PAST 30 DAYS, on how many days did you smoke tobacco in a pipe or hookah?

_____ **(2 digits; 0–30) Q36**

Q37. Have you in the PAST 12 MONTHS used electronic cigarettes, e-cigarettes, or "vaping," even just one time? Q37

Yes **1**
No **2 [Skip to Q40]**

[IF Q37 = MISSING, CONTINUE TO Q38]

Q38. During the PAST 30 DAYS, on how many days did you use electronic cigarettes, e-cigarettes, or "vaping"?

_____ **(2 digits; 0–30) Q38**

Q39. This is a list of possible reasons people sometimes give for using e-cigarettes. Thinking of all the times you used e-cigarettes, why did you use e-cigarettes? Select all that apply.

Because they are healthier for me than smoking cigarettes. **Q39_1**
Because they help me to quit smoking cigarettes. **Q39_2**
Because they can be used in places where cigarette smoking is not allowed. **Q39_3**
None of the above **Q39_4**

Next, we have some questions about your experience with a number of different substances. Remember, your responses are confidential.

Q40. In the PAST 12 MONTHS have you used the following?

	Yes 1	No 2
a. Marijuana or hashish (such as pot, joints, blunts, chronic, weed, edibles) Q40A		
b. Synthetic cannabis (such as spice, K2, herbal smoking blend) Q40B		
c. Other illegal drugs (such as cocaine or crack, LSD or acid, PCP or angel dust, MDMA or ecstasy, methamphetamine or speed, heroin or smack, GHB or liquid ecstasy) Q40C		
d. Inhalants to get high (such as aerosol sprays, gasoline, poppers, snappers, rush, whippets) Q40D		
e. Synthetic stimulants (such as bath salts) Q40E		
f. Non-prescription cough or cold medicine (robos, DXM, etc.) to get high Q40F		
g. Non-prescription Anabolic steroids Q40G		

Q41. Which of the following substances did you use in the PAST 12 MONTHS? Select all that apply. [Ask only if Q40c = 1 (Yes).]

Cocaine (e.g., crack) Q41_1
LSD (e.g., acid, boomers, yellow sunshine) Q41_1
PCP (e.g., angel dust, ozone, wack, rocket fuel) Q41_3
MDMA or ecstasy (e.g., molly, XTC, X, Adam) Q41_4
Methamphetamine (e.g., meth, crystal meth, uppers, speed, ice, chalk, crystal, class, fire, crank) Q41_5
Heroin (e.g., smack, H, junk skag) Q41_6
GHB (e.g., Grievous Bodily Harm, Liquid Ecstasy, Georgia Home Boy) Q41_7
None of the above Q41_8

Q42. Did you use the following substances in the PAST 30 DAYS? [Ask only if corresponding item in Q40a-g = 1 (Yes).]

	Yes 1	No 2
Marijuana or hashish (such as pot, joints, blunts, chronic, weed, edibles) Q42A		
Synthetic cannabis (such as spice, K2, herbal smoking blend) Q42B		
Other illegal drugs (such as cocaine or crack, LSD or acid, PCP or angel dust, MDMA or ecstasy, methamphetamine or speed, heroin or smack, GHB or liquid ecstasy) Q42C		
Inhalants to get high (such as aerosol sprays, gasoline, poppers, snappers, rush, whippets) Q42D		
Synthetic stimulants (such as bath salts) Q42E		
Non-prescription cough or cold medicine (robos, DXM, etc.) to get high Q42F		
Non-prescription Anabolic steroids Q42G		

Q43. In the PAST 12 MONTHS have you used the following? [Randomize.]

	Yes 1	No [If no to Q43a-c skip to Q46] 2
Prescription stimulants or attention enhancers ("go drugs," such as Adderall, amphetamines, Ritalin, prescription diet pills, etc.) Q43A		
Prescription sedatives, tranquilizers, muscle relaxers, or barbiturates ("no go drugs," such as Ambien, Quaalude, Valium, Xanax, Rohypnol, Phenobarbital, Ketamine, etc.) Q43B		
Prescription pain relievers (OxyContin/ Oxycodone, Percocet, codeine, Methadone, hydrocodone, Vicodin, etc.) Q43C		

Q44. In the PAST 12 MONTHS, did you use the following drugs in any way not directed by a doctor (including use without a prescription of your own, or using it in greater amounts, more often, or longer than you were told to take it)? [Ask only if corresponding item in Q43 = Yes (1). Within respondent, keep same order as Q43.]

	Yes 1	No 2
Prescription stimulants or attention enhancers ("go drugs," such as Adderall, amphetamines, Ritalin, prescription diet pills, etc.) Q44A		
Prescription sedatives, tranquilizers, muscle relaxers, or barbiturates ("no go drugs," such as Ambien, Quaalude, Valium, Xanax, Rohypnol, Phenobarbital, Ketamine, etc.) Q44B		
Prescription pain relievers (OxyContin/ Oxycodone, Percocet, codeine, Methadone, hydrocodone, Vicodin, etc.) Q44C		

Q45. How did you obtain the following in the PAST 12 MONTHS? If you obtained it from more than one source, select all that apply. [Ask only if corresponding item in Q43 = Yes (1). Within respondent, keep same order as Q43.]

	Military health care provider or pharmacy/ mail order drug service	VA health care provider or pharmacy/ mail order drug service	Civilian (non-military, non-VA) health care provider or pharmacy/ mail order drug service	Other
Prescription stimulants or attention enhancers ("go drugs," such as Adderall, amphetamines, Ritalin, prescription diet pills, etc.)	Q45A_1	Q45A_2	Q45A_3	Q45A_4
Prescription sedatives, tranquilizers, muscle relaxers, or barbiturates ("no go drugs," such as Ambien, Quaalude, Valium, Xanax, Rohypnol, Phenobarbital, Ketamine, etc.)	Q45B_1	Q45B_2	Q45B_3	Q45B_4
Prescription pain relievers (OxyContin/ Oxycodone, Percocet, codeine, hydrocodone, Vicodin, etc.)	Q45C_1	Q45C_2	Q45C_3	Q45C_4

Q46. This next set of questions asks about sexual behavior. Please remember that your answers are strictly confidential. In the PAST 12 MONTHS, with how many different people did you have sexual intercourse, either vaginal or anal? Select one response. Q46

5 or more people **1**
2–4 people **2**
1 person **3**
I did not have vaginal or anal sex in the past 12 months **4 [Skip to Q48]**

[IF Q46 = MISSING, CONTINUE TO Q47]

Q47. In the PAST 12 MONTHS, how often did you use a condom when having sexual intercourse (vaginal or anal) with a NEW sex partner? A new sex partner is someone you were having sex with for the first time. Select one response. Q47

Always **1**
Often **2**
Sometimes **3**
Seldom **4**
Never **5**
I did not have a new vaginal or anal sex partner in the past 12 months. **6**

Q48. In the PAST 12 MONTHS, how many of your partners for ORAL, ANAL or VAGINAL sex were male? Select one response. Q48

5 or more male partners **1**
2–4 male partners **2**
1 male partner **3**
No male partners in the past 12 months **4**

Q49. In the PAST 12 MONTHS, how many of your partners for ORAL, ANAL or VAGINAL sex were female? Select one response. Q49

5 or more female partners **1**
2–4 female partners **2**
1 female partner **3**
No female partners in the past 12 months **4**

Q50. The last time you had vaginal sex in PAST 12 MONTHS, did you or your partner use any form of birth control? Select all that apply. [If 1–4 are selected, 5–12 cannot be selected.]

I have not had vaginal sex in the past 12 months Q50_1 **[CANNOT SELECT THIS OPTION WITH ANY OTHER OPTION]**
No, we didn't use any form of birth control Q50_2
No, I/my partner was already pregnant Q50_3
No, I/my partner was trying to get pregnant Q50_4
Yes, female sterilization (e.g. tubal ligation, hysterectomy) Q50_5
Yes, male sterilization (vasectomy) Q50_6
Yes, an IUD Q50_7
Yes, a contraceptive implant (e.g. Implanon, Nexplanon) Q50_8
Yes, birth control pills Q50_9
Yes, birth control shots, birth control patch, contraceptive ring, or a diaphragm Q50_10
Yes, condoms Q50_11
Yes, some other method Q50_12

[IF Q50 = MISSING, CONTINUE TO Q51]

Q51. In the PAST 12 MONTHS, did you cause or did you have an unintended pregnancy? Select one response. Q51

Yes **1**
No **2 [SKIP to Q53]**
Unsure **3 [Show only if male (Q4 = 1) or other (Q4 = 3).] [Skip to Q53]**

[IF Q51 = MISSING, SKIP TO Q53]

Q52. At the time that the unintended pregnancy occurred, were you or your partner using any form of birth control? (If there was more than one unintended pregnancy in the past 12 months, answer for the most recent one). Select all that apply.

No, we were not using any form of birth control **Q52_1**
Yes, female sterilization (e.g. tubal ligation, hysterectomy) **Q52_2**
Yes, male sterilization (vasectomy) **Q52_3**
Yes, an IUD **Q52_4**
Yes, a contraceptive implant (e.g. Implanon, Nexplanon)**Q52_5**
Yes, birth control pills **Q52_6**
Yes, birth control shots, birth control patch, contraceptive ring, or a diaphragm **Q52_7**
Yes, condoms **Q52_8**
Yes, some other method **Q52_9**

Q53. When was your last HIV test? Select one response. Q53

Within the past 6 months. **1**
More than 6 months ago but within the past 12 months. **2**
More than 12 months ago. **3**
I have never had an HIV test. **4**

Q54. In the PAST 12 MONTHS, have you had a sexually transmitted infection—such as gonorrhea, syphilis, chlamydia, HPV, or genital herpes? Q54

Yes **1**
No **2**
Have not been tested in past 12 months **3**

Q55. These next questions ask how you have been feeling during the past month. During the PAST 30 DAYS, how much of the time did you feel:

	All of the time 1	Most of the time 2	Some of the time 3	A little of the time 4	None of the time 5
…so sad nothing could cheer you up? Q55A					
…nervous? Q55B					
…restless or fidgety? Q55C					
…hopeless? Q55D					
…that everything was an effort? Q55E					
…worthless? Q55F					

PROGRAMMER: CREATE Q55_SCORE WHERE '5 – ORIGINAL ITEM VALUE = SCORE VALUE' AND SUM SCORE.

Q56. The last questions asked about how you have been feeling during the past 30 days. Now think about the past 12 months. Was there a month in the PAST 12 MONTHS when you felt MORE depressed, anxious, or emotionally stressed than you felt during the past 30 days? Q56

Yes **1**
No **2 [Skip to Q58]**

Q57. Think of one month in the PAST 12 MONTHS when you were the most depressed, anxious, or emotionally stressed. During that month, how much of the time did you feel:

	All of the time 1	Most of the time 2	Some of the time 3	A little of the time 4	None of the time 5
…so sad nothing could cheer you up? Q57A					
…nervous? Q57B					
…restless or fidgety? Q57C					
…hopeless? Q57D					
…that everything was an effort? Q57E					
…worthless? Q57F					

PROGRAMMER: CREATE Q57_SCORE WHERE '5 – ORIGINAL ITEM VALUE = SCORE VALUE' AND SUM SCORE.

Q58. How many times in the PAST 30 DAYS did you . . . ?

	Never 1	One time 2	Two times 3	Three or four times 4	Five or more times 5
Get angry at someone and yell or shout at them. Q58A					
Get angry with someone and kick or smash something, slam the door, punch the wall, etc. Q58B					
Threaten someone with physical violence. Q58C					
Get into a fight with someone and hit the person. Q58D					

Q59. How important is spirituality in your life? By spirituality we mean a set of beliefs, principles, or practices that strengthen your connectedness with sources of hope, meaning, and purpose. Q59

Very important **1**
Somewhat important **2**
Not too important **3**
Not at all important **4**

Q60. Thinking about any mental or physical symptoms you may have, on how many days in the PAST 30 DAYS…

	Number of days
Did your symptoms cause you to miss school or work or leave you unable to carry out your normal daily responsibilities? Q60A	
Did you feel so impaired by your symptoms that, even though you went to school or work, your productivity was reduced? Q60B	

Q61. In the PAST 12 MONTHS did you have any injury(ies) from any of the following events? Answer for any injury you had, whether or not it was military or work related. Select all that apply.

I was struck by a flying object or fragment **Q61_1**
I was wounded by a bullet **Q61_2**
I was in a vehicle accident/crash (any vehicle, including bicycle, boat, motorcycle, car, aircraft) **Q61_3**
I took a hard fall **Q61_4**
I was injured in a blast or explosion **Q61_5**
I was injured in another way **Q61_6**
I did not have an injury **Q61_7 [Skip to Q64; CANNOT SELECT THIS OPTION WITH ANY OTHER OPTION]**

[IF Q61 = MISSING, SKIP TO Q64]

Q62. As a result of the events in the previous question, did you receive a jolt or blow to your head that IMMEDIATELY resulted in the following? [If Q62a through Q62g all No (2) skip to Q64.]

	Yes 1	No 2
Lost consciousness or got "knocked out" for less than a minute Q62A		
Lost consciousness or got "knocked out" for 1 to 20 minutes Q62B		
Lost consciousness or got "knocked out" for more than 20 minutes Q62C		
Felt dazed, confused, or "saw stars" Q62D		
Did not remember the event Q62E		
Concussion or symptoms of a concussion (such as headache, dizziness, irritability, etc.) Q62F		
Head injury Q62G		

Q63. Over the PAST 30 DAYS, have you been bothered by any of the following problems that you relate to this jolt or blow to the head? [Randomize.]

	Yes 1	No 2
Headaches Q63A		
Dizziness Q63B		
Memory problems (or lapses) Q63C		
Balance problems Q63D		
Ringing in the ears Q63E		
Irritability Q63F		
Sleep problems Q63G		
Sensitivity to light Q63H		

Q64. The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact? Q64

Yes **1**
No **2 [Skip to Q66]**

[IF Q64 = MISSING, SKIP TO Q66]

Q65. Did this unwanted sexual contact occur in the PAST 12 MONTHS? Q65

Yes **1**
No **2**

Q66. Since joining the military, have you been physically abused, punished, or beaten such that you received bruises, cuts, welts, lumps, or other injuries, whether or not it was work-related? Q66

Yes **1**
No **2 [Skip to Q68]**

[IF Q66 = MISSING, CONTINUE TO Q67]

Q67. Did you have an experience where you were physically abused, punished, or beaten such that you received bruises, cuts, welts, lumps, or other injuries in the PAST 12 MONTHS? Q67

Yes **1**
No **2**

Q68. Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example, a serious accident or fire, a physical or sexual assault or abuse, an earthquake or flood, a war, seeing someone be killed or seriously injured, having a loved one die through homicide or suicide. Have you ever experienced this kind of event? Q68

Yes **1**
No **2 [Skip to Q70]**

[IF Q68 = MISSING, SKIP TO Q70]

Q69. In the PAST 30 DAYS have you…

	Yes 1	No 2
Had nightmares about the event(s) or thought about the event(s) when you did not want to? Q69_1		
Tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)? Q69_2		
Been constantly on guard, watchful, or easily startled? Q69_3		
Felt numb or detached from people, activities, or your surroundings? Q69_4		
Felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused? Q69_5		

Q70. In the PAST 12 MONTHS, have you seen any of the following professionals about problems with stress, your emotions, or mental health, or for problems with your use of alcohol or drugs?

	Yes 1	No [If no for Q70a-c skip to Q73] 2
Mental health provider (e.g., psychiatrist, psychologist, social worker, mental health nurse, other provider) Q70A		
General medical provider (e.g., doctor, physician assistant or PA, nurse practitioner) Q70B		
Chaplain, clergy, or pastor Q70C		

[IF Q670a-c = MISSING, SKIP TO Q73]

Q71. Where was/were the professional(s) you saw about problems with stress, your emotions, or mental health, or for problems with your use of alcohol or drugs located? [Ask only if ANY Q70a-c = 1 (Yes).]

	Yes 1	No 2
Military facility Q71A		
VA facility Q71B		
Non-VA civilian facility or office Q71C		

Q72. In the PAST 12 MONTHS, how many times did you see that/those professional(s) about problems with stress, your emotions, or mental health, or for problems with your use of alcohol or drugs? If you have not seen a provider in the past 12 months, please enter zero. [Ask only if any Q70a-c = 1 (Yes) and any Q71a-c =1 (yes). Show all permutations that apply.]

a. **[DISPLAY IF Q70A = 1 AND Q71A = 1]** Mental health provider at a military facility or office **Q72A**
b. **[DISPLAY IF Q70A = 1 AND Q71B = 1]** Mental health provider at a VA facility **Q72B**
c. **[DISPLAY IF Q70A = 1 AND Q71C = 1]** Mental health provider at a non-VA civilian facility or office **Q72C**
d. **[DISPLAY IF Q70B = 1 AND Q71A = 1]** General medical provider at a military facility **Q72D**
e. **[DISPLAY IF Q70B = 1 AND Q71B = 1]** General medical provider at a VA facility **Q72E**
f. **[DISPLAY IF Q70B = 1 AND Q71C = 1]** General medical provider at a non-VA civilian facility or office **Q72F**
g. **[DISPLAY IF Q70C = 1 AND Q71A = 1]** Military chaplain at a military facility **Q72G**
h. **[DISPLAY IF Q70C = 1 AND Q71B = 1]** Clergy or other pastoral counselor at a VA facility **Q72H**
i. **[DISPLAY IF Q70C = 1 AND Q71C = 1]** Clergy or other pastoral counselor at non-VA civilian facility or office **Q72I**

Q73. During the PAST 12 MONTHS, did you take any medication that was prescribed for you to treat problems with your emotions, nerves or mental health, or for problems with your use of alcohol or drugs? Q73

Yes **1**
No **2**

Q74. During the PAST 12 MONTHS, was there ever a time that you needed treatment for an emotional or mental health problem or for your use of alcohol or drugs but did not get it? Q74

Yes **1**
No **2**

Q75. Which of these statements explain why you did not get mental health treatment or counseling in the PAST 12 MONTHS? [Ask if Q74 = 1 (Yes) OR sum of Q55 >= 8 and no items endorsed on Q70 OR sum of Q57>=8 and no items endorsed on Q70.]

	Yes 1	No 2
I did not think treatment would help. Q75A		
I did not know where to get help. Q75B		
It was too difficult to schedule an appointment. Q75C		
It would have harmed my career. Q75D		
I could have been denied security clearance in the future. Q75E		
I could not afford the cost. Q75F		
My supervisor/unit leadership might have a negative opinion of me or treat me differently. Q75G		
Members of my unit might have less confidence in me. Q75H		
I was concerned that the information I gave the counselor might not be kept confidential. Q75I		
It would have negatively affected my family life. Q75J		
It was too difficult to get time off work for treatment. Q75K		
It was too difficult to get childcare. Q75L		
My commanders or supervisors discourage the use of mental health services. Q75M		
I did not think I needed it. Q75N [Only show if Q55>=8 or Q57>=8 and no items endorsed on Q70.]		

Q76. In general, do you think it would damage a person's military career if the person were to seek counseling or mental health therapy/treatment through the military, regardless of the reason for seeking counseling? Q76

Yes **1**
No **2**

Q77. At any time in the PAST 12 MONTHS, did you seriously think about trying to kill yourself? Q77

Yes **1**
No **2 [Skip to Q79]**

[IF Q77 = MISSING, Continue TO Q78]

Q78. During the PAST 12 MONTHS, did you make any plans to kill yourself? Q78

Yes **1**
No **2**

[IF Q78 = MISSING, Continue TO Q79]

Q79. During the PAST 12 MONTHS, did you try to kill yourself? Q79

Yes **1**
No **2**

Q80. Next, we have some questions concerning ALL of your deployments while serving in the military. These could include both combat and non-combat deployments. How many times have you been deployed? Select one response. Q80

1 time **1**
2 times **2**
3 or more times **3**
I have never been deployed **4 [SKIP to Q89]**

[IF Q80 = MISSING, SKIP TO Q89]

Q81. Adding up ALL of your deployments while serving in the military, how long in TOTAL have you been deployed? Include both combat and non-combat zone deployments. Select one response. Q81

1 to 6 months **1**
7 to 12 months **2**
13 to 24 months **3**
25 to 48 months **4**
49 months or more **5**

Q82. Thinking about ALL of your deployments while serving in the military, how many were COMBAT zone deployments? (The term "combat zone deployment," as used in this questionnaire, refers to a deployment where you received imminent danger pay (IDP), hazardous duty pay, and/or combat zone tax exclusion benefits.) Select one response. Q82

I have not had any combat zone deployments **1**
1 deployment **2**
2 deployments **3**
3 or more deployments **4**

Q83. During ALL of your deployments while in the military, both combat and non-combat, did any of the following EVER happened to you? [Randomize.]

	Yes 1	No 2
I worked with landmines or other unexploded ordnance. Q83A		
I witnessed members of my unit or an ally unit being seriously wounded or killed. Q83V		
Someone I knew well was killed in combat. Q83C		
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement. Q83D		
I was wounded in combat. Q83E		
I witnessed civilians being seriously wounded or killed. Q83F		

Q84. In the PAST 12 MONTHS, approximately how many months were you away in total for ALL deployments, both combat and non-combat zone deployments? Select one response. Q84

I did not deploy in the past 12 months **1 [Skip to Q89]**
Less than 1 month **2**
1 to 3 months **3**
4 to 6 months **4**
7 to 9 months **5**
10 to 12 months **6**

[IF Q84 = MISSING, SKIP TO Q89]

Q85. Previously in the survey you indicated that you had or [if Q51 = unsure (3) insert "may have"] caused an unintended pregnancy in the past 12 months. Did that unintended pregnancy occur during a deployment? [Ask if Q51 is Yes (1) or unsure (3) and Q84 > 1.] Q85

Yes **1**
No, before I was deployed **2**
No, after the end of the deployment **3**

Q86. Before you deployed, did you and a care provider from the Military Health System talk about the pros and cons of using various birth control methods in a deployed environment? (For example, how easy they are to use or obtain, their effects on menstrual periods, or other factors.) Q86

Yes **1**
No **2**

Q87. BEFORE YOU DEPLOYED, were you able to get or refill your preferred method of birth control? Q87

Yes **1**
No **2**
I did not try to get birth control before I deployed. **3**

Q88. WHILE YOU WERE DEPLOYED, were you able to get or refill your preferred method of birth control? Q88

Yes **1**
No **2**
I did not try to get or refill birth control while deployed **3**

Q89. Do you consider yourself to be…? Select one response. Q89

Heterosexual or straight **1**
Gay or lesbian **2**
Bisexual **3**

Q90. On average, over the PAST 30 DAYS, how many hours of actual sleep do you get in a 24-hour period? This may be different from the number of hours you spent in bed. Please type in the number of hours. Q90

_____ Hours **(2 digits; 0–24)**

Q91. During the PAST 30 DAYS, how would you rate your overall sleep quality? Select one response. Q91

Very good **1**
Fairly good **2**
Fairly bad **3**
Very bad **4**

Q92. In the past week, how much were you bothered by lack of energy because of poor sleep? Select one response. Q92

Not bothered at all **1**
Slightly bothered **2**
Moderately bothered **3**
Severely bothered **4**

Q93. During the PAST 30 DAYS, how often did you use the following TO HELP YOU STAY AWAKE?

	Never during the past 30 days 1	Less than once a week 2	Once or twice a week 3	Three or more times a week 4	Daily 5
Energy drinks (e.g., Monster, Red Bull, Rockstar, 5-Hour-Energy) Q93A					
Caffeinated beverages besides energy drinks (e.g., coffee, soda, tea) Q93B					
Over-the-counter (OTC) medications (e.g., Vivarin, NoDoz) Q93C					
Prescription medications (e.g., Adderall, Ritalin) Q93D					

Q94. During the PAST 30 DAYS, how often did you take prescription or over-the-counter (OTC) medications TO HELP YOU SLEEP? Q94

Never during the past 30 days **1**
Less than once a week **2**
Once or twice a week **3**
Three or more times a week **4**
Daily **5**

Q95. In the PAST 12 MONTHS, have you ever had to lie to people important to you about how much you gambled? Q95

Yes **1**
No **2**

Q96. In the PAST 12 MONTHS, have you ever felt the need to bet more and more money? Q96

Yes **1**
No **2**

Q97. The following questions will ask you about events that happened IN THE PAST 12 MONTHS. Remember, all the information you share will be kept completely confidential. In the PAST 12 MONTHS have you…

	Yes 1	No 2
Fondled, kissed, or rubbed up against the private areas of someone's body (lips, breast, crotch, penis, inner thighs, or anus) when the person did not agree. Q97A		
Had oral sex with someone or had someone perform oral sex on you when the person did not agree. Q97B		
Put your penis, fingers, or objects into someone's vagina or anus when the person did not agree. Q97C		
TRIED to have oral, anal, or vaginal sex with someone when the person did not agree. Q97D		

[CLOSING SCREEN]

You have finished the 2018 DoD Health Related Behaviors Survey (HRBS)! Thank you for taking the time to complete this important survey. Your participation, and your Service to our country, is greatly appreciated.

In the event that any of the questions in the survey may have caused discomfort, we would like to remind you of several resources that are available.

Military OneSource (http://www.militaryonesource.mil) is a free 24 hour service that is available 7 days a week to provide a full range of services, across the deployment cycle, to military personnel and their families, at no cost. They can be reached at:

Stateside: CONUS: 1-800-342-9647
Overseas: OCONUS Universal Free Phone: 800-342-9647
Collect from Overseas: OCONUS Collect: 703-253-7599
En Español llame al: 800-342-9647
TTY/TDD: 866-607-6794

The **DoD Safe Helpline** (https://www.safehelpline.org/) provides worldwide live, confidential support, 24/7. You can initiate a report and search for your nearest Sexual Assault Response Coordinator (SARC). You can find links to Service-specific reporting resources and access information about the prevention of and response to sexual assault on their website or by calling the hotline at 1-877-995-5247.

The **Military Crisis Line** (http://veteranscrisisline.net/ActiveDuty.aspx) can also provide confidential support and consultation if you feel distressed. They can be reached at 1-800-273-8255 (then press 1). Or send a text to 838255.

You may also contact the **National Suicide Hotline** at 1-800-273-TALK (8255) or https://suicidepreventionlifeline.org/.

APPENDIX B

Invitation Letter and Letters of Support

This appendix reproduces recruitment materials, including the invitation letter from RAND and Westat, as well as the letters of support from the DoD services and the Coast Guard.

Invitation Letter

RAND CORPORATION

1776 MAIN STREET
P.O. BOX 2138
SANTA MONICA, CA
90407-2138

TEL 310.393.0411
FAX 310.393.4818

RCS # DD-HA(BE)2189
Expiration Date: 02/28/2023

[Month 2018]

12345
{SALUTE and NAME}
{ADDRESS 1}
{ADDRESS 2}
{CITY}, {STATE} {ZIP CODE}

Subject: Invitation to Participate in the 2018 DoD Health Related Behaviors Survey (HRBS)

Dear [Salute] [Insert Service Member name]:

You have been randomly selected to participate in the **2018 DoD Health Related Behaviors Survey (HRBS)**. We would like to invite you to fill out this **confidential** survey on the Internet. The survey results will be used by the Department of Defense (DoD) to improve health behavior programs and policies that maintain a ready Total Force. Results from previous rounds of the HRBS have resulted in changes to tobacco policy, screening for alcohol use, and interventions to reduce prescription drug abuse. Results have also been presented to the White House as well as Congress. To make the results of the 2018 DoD HRBS as valid and reliable as possible, we need your support!

Please note that:

- This is a legitimate, **DoD-approved research study**, endorsed by the Services. Links to the letters of support from each Service can be found at: http://www.health.mil/2018HRBS.
- The survey is **confidential**: No one at DoD, the Services, or your command will know who completed a survey. Only RAND staff and staff at our survey subcontractor Westat can link your individual survey responses to your name, personal identity, or military records.
- Study staff have been trained to **protect your individual survey responses**.
- You can complete the **web survey** on a computer at home or at work, or on a smartphone or tablet. It takes about 20-25 minutes to fill out the survey.

Please don't miss this opportunity to help DoD develop and enhance health promotion programs that will help service members improve their health, well-being, and overall fitness. The survey results will have a direct impact on policies of interest to you, the Services, and DoD.

For more information, please read the **FREQUENTLY ASKED QUESTIONS** on the back of this letter about the 2018 DoD HRBS and why your participation is so important to the success of this study.

You can complete the survey now by going to the following secure website maintained by Westat, our data collection contractor. You will need to use the unique ID code provided below to access the survey.

Survey website: https://dodhrbs.com

Unique ID Code: [insert code]

Computer or technical questions about the website? Please contact the Westat Survey Help Desk toll free at 1-844-727-2018 or email support@dodhrbs.com

We greatly appreciate your time and cooperation in this important effort.

Sincerely,

Charles C. Engel, MD, MPH, RAND Project Co-Leader

Sarah O. Meadows, PhD, RAND Project Co-Leader

RESEARCH AREAS
Children and Families
Education and the Arts
Energy and Environment
Health and Health Care
Infrastructure and Transportation
International Affairs
Law and Business
National Security
Population and Aging
Public Safety
Science and Technology
Terrorism and Homeland Security

OFFICES
Santa Monica, CA
Washington, DC
Pittsburgh, PA
New Orleans, LA
Jackson, MS
Boston, MA
Cambridge, UK
Brussels, BE

www.rand.org

OBJECTIVE ANALYSIS. EFFECTIVE SOLUTIONS.

M1

THE ASSISTANT SECRETARY OF DEFENSE
1200 DEFENSE PENTAGON
WASHINGTON, DC 20301-1200

HEALTH AFFAIRS

JUL 0 9 2018

Dear Service Member:

You are invited to participate in the 2018 Department of Defense (DoD) Health Related Behaviors Survey, which we have asked the independent, non-profit RAND Corporation to design, implement, and analyze. This health survey is important to the DoD and the Services, and I strongly encourage you to participate.

The purpose of this web-based survey is to assess the health related behaviors and lifestyles of military personnel that have the potential to impact readiness. We use data from this survey to improve education, training, treatment, and counseling to support the Services and optimize individual and overall health status and fitness.

The survey is confidential. This means that no one within DoD or the Services, including your immediate chain of command, will know who participated in the survey or will have access to your individual responses to survey items. Only the survey contractors, RAND and Westat, will be able to use unique identification codes to distinguish who has been selected to participate in the survey. Survey results will be presented in such a way that your individual survey responses cannot otherwise be linked back to you. DoD and the Services have agreed to this condition to protect your privacy so you can feel comfortable answering the survey questions truthfully and honestly.

Although your participation in the survey is voluntary, I hope you will recognize its importance and find time to sit down and answer these questions about your health. This survey can be completed online using a government computer during duty hours, a home computer, a smartphone or a tablet.

For further information about the survey and instructions for accessing and completing the survey on the Internet, please read the enclosed RAND Corporation letter and Frequently Asked Questions. Thank you for your continued service to our country and thank you in advance for your time and assistance in this important effort.

Sincerely,

Tom McCaffery
Acting

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

MEMORANDUM FOR U.S. AIR FORCE SURVEY PARTICIPANTS

FROM: Principal Deputy Assistant Secretary (Manpower and Reserve Affairs)

SUBJECT: 2018 Department of Defense Survey of Health Related Behaviors among Active Duty Personnel

The Department of Defense has asked the RAND Corporation and Westat, independent research organizations, to conduct the **2018 DoD Health Related Behaviors Survey (HRBS).** This survey is being conducted with randomly selected military members from all Service branches and all components.

The 2018 HRBS asks about health-related behaviors such as exercise, mental health, substance use and other health issues related to readiness. Some of the questions are personal. **To protect your privacy, the survey is confidential.** DoD, the Air Force, and your chain of command will not know whether you complete the survey or not. Only RAND and Westat will be able to identify who has completed a survey and they will not provide any data to DoD or the Air Force that is linked to your name, other personal identifiers, or your military records.

The RAND Corporation and Westat will send you instructions via mail and email for accessing and completing the 2018 HRBS if you are randomly selected to participate. The survey will take about 20-25 minutes to finish. It can be completed on the web using a government computer during duty hours or a home computer with Internet access. You may also complete the survey on a mobile device, such as smartphone or tablet.

Your participation in the 2018 HRBS is critical to assessing health-related readiness and for making program and policy decisions that sustain a healthy and ready force. Although your participation in the survey is entirely voluntary, I hope you will choose to support this vital effort by responding promptly if you are asked.

Thank you in advance for your time and assistance in this important effort.

DANIEL R. SITTERLY, SES, DAF
Principal Deputy Assistant Secretary
(Manpower and Reserve Affairs)

BREAKING BARRIERS...SINCE 1947

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
MANPOWER AND RESERVE AFFAIRS
111 ARMY PENTAGON
WASHINGTON DC 20310-0111

SAMR-MPQ 1 August 2018

MEMORANDUM FOR Service Member Participants of the 2018 Department of Defense Health Related Behaviors Survey

SUBJECT: 2018 DoD Health Related Behaviors Survey Participation

1. The DoD has asked the RAND Corporation and Westat (independent research organizations) to conduct the 2018 DoD Health Related Behaviors Survey (HRBS). This survey is being conducted with randomly selected military members from all Service branches and components.

2. The 2018 HRBS asks about health-related behaviors such as exercise, stress, substance use, and other health issues related to readiness; some of the questions are personal. To protect your privacy, the survey is completely confidential. Individual survey responses will not be linked with your name or other personal identifiers. The Army or DoD will not know who did or did not complete the survey.

3. If you are randomly selected to participate, the RAND Corporation and Westat will send you instructions via mail and e-mail for accessing and completing the 2018 HRBS. The survey will take about 20-25 minutes to finish and can be completed on the web using a government computer during duty hours or a home computer with internet access. You may also complete the survey on a mobile device, such as smartphone or tablet.

4. Your Participation in the 2018 HRBS is critical to assessing health-related readiness and for making program and policy decisions that sustain a healthy and ready Force. Although your participation in the survey is entirely voluntary, I hope you will choose to support this vital effort by responding promptly if you are asked. Thank you in advance for your time and assistance in this important effort.

5. The Army point of contact for this survey is Ms. Laura Mitvalsky, Army Public Health Center, 410-436-4654, or e-mail laura.a.mitvalsky.civ@mail.mil.

DONALD G. SALO, JR
Deputy Assistant Secretary of the Army
(Military Personnel and Quality of Life)

DEPARTMENT OF THE NAVY
HEADQUARTERS, UNITED STATES MARINE CORPS
3280 RUSSELL ROAD
QUANTICO VA 22134-5103

IN REPLY REFER TO:
6260
MF
MAY 0 8 2018

From: Commandant of the Marine Corps

Subj: 2018 DEPARTMENT OF DEFENSE HEALTH RELATED BEHAVIORS SURVEY

1. The Department of Defense (DoD) has asked the RAND Corporation and Westat, independent research organizations, to conduct the 2018 DoD Health Related Behaviors Survey (HRBS). This survey is being conducted with randomly selected military members from all Service branches and all components.

2. The 2018 HRBS asks about health-related behaviors, such as exercise, mental health, substance use, and other health issues related to readiness. Some of the questions are personal. To protect your privacy, the survey is confidential. The DoD, the Marine Corps, and your chain of command will not know whether you complete the survey or not. Only RAND and Westat will be able to identify who has completed a survey; they will not provide any data to the DoD or the Marine Corps that is linked to your name, other personal identifiers, or your military records.

3. The RAND Corporation and Westat will send you instructions via mail and email for accessing and completing the 2018 HRBS if you are randomly selected to participate. The survey will take about 20-25 minutes to finish. It can be completed on the web using a government computer during duty hours or a home computer with Internet access. You may also complete the survey on a mobile device, such as a smartphone or tablet.

4. Your participation in the 2018 HRBS is critical to assessing health-related readiness and for making program and policy decisions that sustain a healthy and ready force. Although your participation in the survey is entirely voluntary, I hope you will choose to support this vital effort by responding promptly if you are asked.

5. Thank you in advance for your time and assistance in this important effort.

S. M. ISAACSON
Sergeant Major
Marine and Family
Programs Division

M. C. BALOCKI
Director
Marine and Family
Programs Division

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

4730
Ser N17/U 021
2 May 18

From: Director, 21st Century Sailor Office (OPNAV N17)
To: U.S. Navy Survey Participant

Subj: 2018 DEPARTMENT OF DEFENSE SURVEY OF HEALTH RELATED BEHAVIORS AMONG ACTIVE DUTY PERSONNEL

1. If you have been randomly selected to participate in the 2018 Department of Defense (DoD) Health Related Behaviors Survey (HRBS) for Active Duty personnel, I strongly encourage you to support this vital effort by responding promptly when asked to complete the survey.

2. The DoD asked the RAND Corporation and Westat, independent research organizations, to conduct the 2018 DoD HRBS. This survey is being conducted with randomly selected military members from all Service branches and all components.

3. The 2018 HRBS asks about health-related behaviors such as exercise, mental health, substance use and other health issues related to readiness. Some of the questions are personal. To protect your privacy, the survey is confidential. DoD, the Navy, and your chain of command will not know whether you complete the survey or not. Only RAND and Westat will be able to identify who has completed a survey and they will not provide any data to DoD or the Navy that is linked to your name, other personal identifiers, or your military records.

4. The RAND Corporation and Westat will send you instructions via mail and email for accessing and completing the 2018 HRBS if you are randomly selected to participate. The survey will take about 20-25 minutes to finish. It can be completed on the web using a government computer during duty hours or a home computer with Internet access. You may also complete the survey on a mobile device, such as smartphone or tablet.

5. Your participation in the 2018 HRBS is critical to assessing health-related readiness and for making program and policy decisions that sustain a healthy and ready force. Although your participation in the survey is entirely voluntary, I hope you will choose to support this vital effort by responding promptly if you are asked.

6. I want to thank you in advance for your time and participation in this important study effort.

K. O. THOMAS

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2703 Martin Luther King Jr. Ave. S.E.
Washington, DC 20593-7581
Staff Symbol: CG-11
Phone: (202) 475-5130

6500

JAN - 6 2018

MEMORANDUM

From: Erica G. Schwartz, RADM
CG-11

Reply to Attn of: Mark Mattiko
(202) 475-5148

To: ACTIVE DUTY & RESERVE MEMBERS OF THE COAST GUARD

Subj: PARTICIPATION IN THE 2018 HEALTH RELATED BEHAVIORS SURVEY

1. The Department of Defense (DoD) has asked the RAND Corporation and Westat, independent research organizations, to conduct the **2018 DoD Health Related Behaviors Survey (HRBS).** This survey is being conducted with randomly selected military members from all Service branches and all components.

2. The 2018 HRBS asks about health-related behaviors such as exercise, mental health, substance use and other health issues related to readiness. Some of the questions are personal. **To protect your privacy, the survey is confidential.** DoD, the United States Coast Guard (USCG) and your chain of command will not know whether you complete the survey or not. Only RAND and Westat will be able to identify who has completed a survey and they will not provide any data to DoD or the USCG that is linked to your name, other personal identifiers, or your military records.

3. The RAND Corporation and Westat will send you instructions via mail and email for accessing and completing the 2018 HRBS if you are randomly selected to participate. The survey will take about 20-25 minutes to finish. It can be completed on the web using a government computer during duty hours or a home computer with Internet access. You may also complete the survey on a mobile device, such as smartphone or tablet.

4. Your participation in the 2018 HRBS is critical to assessing health-related readiness and for making program and policy decisions that sustain a healthy and ready force. Although your participation in the survey is entirely voluntary, I hope you will choose to support this vital effort by responding promptly if you are asked.

5. Thank you in advance for your time and assistance in this important effort.

#

APPENDIX C

Description of Measures Used in the 2018 DoD Health Related Behaviors Survey

This appendix provides details for key measures used in each chapter. Only measures that did not come from survey data, that required significant recoding, or that are combinations of multiple survey items are shown. When applicable, we provide references for existing scales or indexes.

Chapter Three: Demographics

Housing status (Q1). Housing status included the following four categories:

- housing off an installation: military housing (including privatized) off main base (Q1 = 3), civilian housing that you own or pay mortgage on (Q1 = 4), and civilian housing that you rent, off base (Q1 = 5)
- living in dorms or barracks on an installation: dorms/barracks (Q1 = 1)
- other housing on an installation: military housing (including privatized) on main base (Q1 = 2)
- other living situation: some other living situation (e.g., living with parents, temporary housing) (Q1 = 6).

Marital status (Q2, Q3). Marital status included the following four categories:

- *married (Q2 = 1)*
- *cohabiting (Q2 = 2, 3, 4, or 5 and Q3 = 1)*
- *never married (Q2 = 5)*
- *separated, divorced, widowed (Q2 = 2, 3, or 4)*

Gender. Gender was derived from administrative data provided by DMDC during the sampling process. Gender was coded as male or female. Self-reported gender from the survey (Q4) was used only if gender was missing in the administrative data.

Pay grade. Pay grade was derived from administrative data provided by DMDC during the sampling process. Pay grade included the following six categories: E1–E4, E5–E6, E7–E9, W1–W5, O1–O3, and O4–O6.

Education level. Education level was derived from administrative data provided by DMDC during the sampling process. Education included the following three categories:

- high school or less: 12 years or less of schooling (no diploma), high school graduate—traditional diploma, or high school graduate—alternative diploma
- some college: some college credit but no degree or associate's degree
- bachelor's degree or more: bachelor's degree or graduate or professional degree.

Race/ethnicity. Race/ethnicity was derived from administrative data provided by DMDC during the sampling process. Racial/ethnic categories included the following:

- Hispanic, including Mexican, Mexican-American, Chicano, Puerto Rican, Cuban, or other Spanish/Hispanic/Latino
- non-Hispanic white
- non-Hispanic black
- non-Hispanic Asian, including Indian, Chinese, Filipino, Japanese, Korean, or Vietnamese
- other: not Spanish/Hispanic/Latino and American Indian or Alaska Native, Native Hawaiian or other Pacific Islander (e.g., Samoan, Guamanian, Chamorro), or more than one race.

Parental status. Parental status was derived from administrative data provided by DMDC during the sampling process. Parental status was defined as "1" if the respondent had at least one dependent under the age of 18.

Employment status (Q5, Q6). Employment was derived by combining two survey items into six mutually exclusive categories: full-time employment (35 or more hours per week; includes self-employed), part-time employed (less than 35 hours per week), full time homemaker or parent/student, retired/disabled/other, unemployed and looking for work, and unemployed not looking for work/out of the labor force.

Chapter Four: Health Promotion and Disease Prevention

Weight status (Q9, Q10). Two standard items asked respondents to report their height (Q9) and weight (Q10). Weight status was based on BMI, which was calculated as

$$\frac{Weight(lbs) \times 703}{Height(in)^2}.$$

For service members aged 20 or older, we categorized BMI using CDC criteria (CDC, 2015a), and for service members younger than age 20, we used age- and sex-specific definitions established by the CDC (CDC, 2015b).

Weight was categorized as follows for service members aged 20 or older:

- underweight: BMI < 18.5 kg/m^2
- normal: BMI 18.5–24.99 kg/m^2
- overweight: BMI 25.00–29.99 kg/m^2
- obese: BMI ≥ 30.0 kg/m^2.

Weight was categorized as follows for service members younger than age 20:

- underweight: BMI < 5th percentile for age or gender
- normal: BMI 5th–84th percentile for age or gender
- overweight: BMI 85th–94th percentile for age or gender
- obese: BMI ≥ 95th percentile for age or gender.

Physical activity (Q11, Q12). Respondents were asked about the frequency (Q11) and duration (Q12) of MPA and VPA in the past 30 days. These two questions were combined into two categorical measures of MPA and VPA and are modeled after items on the NHANES (National Center for Health Statistics, 2016).

MPA was categorized as

- < 150 minutes per week
- 150–299 minutes per week
- 300+ minutes per week.

VPA was categorized as

- < 75 minutes per week
- 75–149 minutes per week
- 150+ minutes per week.

Screen time (Q13). A single item asked respondent to indicate the average daily amount of time they spent on a device with a screen, excluding work or school, over the past 30 days. Device examples included a desktop or laptop computer, television, smartphone, tablet (e.g., iPad, Kindle), or other handheld device or gaming system. Response options included none, less than one hour, 1–2 hours, 3–4 hours, 5–10 hours, and 11 hours or more. We collapsed these categories into three groupings: less than one hour, 1–4 hours, and 5+ hours. This item is similar to an item on the NHANES (National Center for Health Statistics, 2016).

Annual physical assessment (Q17). A single item asked respondents whether they had a routine checkup in the past 12 months. The exam was described as a general physical exam, not for specific injury, illness, or condition. Response options include yes and no. This measure is similar to an item included in the 2015 HRBS.

Health insurance (Q7, Q8). Respondents were asked to first identify whether they were covered by any health insurance plan. If the respondent indicated that they were covered, they were then asked to identify what type of insurance coverage they had. Response options included

TRICARE or other military health insurance, Veterans Affairs (including CHAMPVA), private insurance, and government insurance provided to low-income individuals (e.g., Medicaid). Respondents could select more than one insurance type. These items were only asked of reserve component service members.

Average daily sleep amount (Q90). Respondents were asked about the average amount of sleep they had gotten in the past 30 days in hours. The item had an open-ended response option (i.e., respondents directly typed in the number of hours) and was modeled after a similar item in the BRFSS (CDC, 2018c).

Sleep quality (Q91). Respondents were asked to rate their sleep quality over the past 30 days. Response options included very good, fairly good, fairly bad, and very bad. This item was based on an item in the Pittsburgh Insomnia Rating Scale (Moul et al., 2002).

Lack of energy due to sleep problems (Q92). Respondents were asked how much they had been bothered by a lack of energy due to poor sleep over the past week. Response options included not bothered at all, slightly bothered, moderately bothered, and severely bothered. We collapsed across response options to create a single group that was moderately or severely bothered. This item was also based on an item in the Pittsburgh Insomnia Rating Scale (Moul et al., 2002).

Use of medications to sleep (Q93). Respondents were asked how often they had used the following medications to stay awake in the past 30 days: energy drinks (e.g., Monster, Red Bull, Rockstar, 5-Hour Energy), caffeinated beverages other than energy drinks (e.g., coffee, soda, or tea), OTC medications (e.g., Vivarin, NoDoz), and prescription medications (e.g., Adderall, Ritalin). Response options included not in the past 30 days, less than once a week, once or twice a week, three or more times a week, and daily. We collapsed across categories to create three groups based on use: never, 1–2 times per week, and three or more times per week. This measure was developed for the 2018 HRBS.

Use of substances to sleep (Q94). A single item asked respondents how often they had used prescription or OTC medications to help them sleep over the past 30 days. Response options included not in the past 30 days, less than once a week, once or twice a week, three or more times a week, and daily. We collapsed across categories to create three groups: never, 1–2 times per week, and three or more times per week. This item was based on a similar item in the 2015 HRBS but used different response options.

Chapter Five: Substance Use and Health

Binge drinking, past 30 days (Q26). Respondents who binge drank at least once in the past 30 days (Q26 ≤ 6)—that is, men who drank five or more drinks and women who drank four or more drinks on the same occasion at least once in the past 30 days—were classified as current binge drinkers. Note that only past-30-days drinkers (Q24 > 1) received this item. This item was taken from the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a).

Heavy drinking, past 30 days (Q26). Respondents who reported binge drinking at least 1 or 2 days a week during the past 30 days (Q26 ≤ 4) were classified as heavy drinkers. Note that only past-30-day drinkers (Q24 > 1) received this item. This definition is similar to the heavy drinking definition used by the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a), which is binge drinking on five or more days in the past 30 days. The 2018 HRBS used a slightly lower threshold given the categorical response options presented to service members as compared with the actual number of days in the past 30 days a person engaged in binge drinking on the NSDUH.

Any serious drinking consequences (Q21). Respondents who endorsed any of Q21a through Q21j were classified as experiencing serious drinking consequences in the past year. Only past-year drinkers (Q20 = yes) received this item. This item was modified from the 2015 HRBS (Meadows et al., 2018).

Any risky drinking and driving (Q22). Respondents who endorsed either Q22a or Q22b were categorized as engaging in risky drinking and driving behaviors in the past year. Note that subitem Q22a was only asked of past-year drinkers (Q20 = yes), but Q22b was asked of all respondents regardless of whether they endorsed drinking in the past 12 months or not. This item was modified from the 2015 HRBS (Meadows et al., 2018).

Productivity loss from drinking (Q23). Respondents who endorsed any item in Q23a through Q23f were considered to have experienced past-year job-related productivity loss from drinking. Only past-year drinkers (Q20 = yes) received this item. This item was modified from the 2015 HRBS (Meadows et al., 2018).

Military drinking culture (Q19). Respondents who reported that they agreed with any of Q19a through Q19d were classified as perceiving the military culture as supportive of drinking. This item was modified from the 2015 HRBS (Meadows et al., 2018).

Current cigarette smokers (Q27, Q28). Respondents who reported smoking in the past 30 days (Q28 ≥ 1) were classified as current cigarette smokers. Past-30-day users also had to indicate that they had smoked cigarettes in the past 12 months (Q27 = yes) to be presented with Q28. This measure is from the NHIS (CDC, 2019a).

Current e-cigarette user (Q37, Q38). Respondents who reported using e-cigarettes in the past 30 days (Q38 ≥ 1) were classified as current e-cigarette users. Past-30-day users also had to indicate that they had used e-cigarettes in the past 12 months (Q37 = yes) to be presented with Q38. This measure was modified from the NHIS (CDC, 2019a).

Current cigar smoker (Q33, Q34). Respondents who reported using cigars, cigarillos, or little cigars in the past 30 days (Q34 ≥ 1) were classified as current cigar users. Past-30-day users also had to indicate that they had used cigars, cigarillos, or little cigars in the past 12 months (Q33 = yes) to be presented with Q34. This measure was modified from the NHIS (CDC, 2019a).

Current smokeless tobacco user (Q31, Q32). Respondents who reported using smokeless tobacco (i.e., chewing tobacco or snuff) in the past 30 days (Q32 ≥ 1) were classified as current smokeless tobacco users. Past-30-day users also had to indicate that they had used smokeless tobacco in the past 12 months (Q31 = yes) to be presented with Q32. This measure was added to the 2018 HRBS be consistent with the other tobacco-related items.

Current pipe or hookah user (Q35, Q36). Respondents who reported smoking tobacco in a pipe or hookah in the past 30 days (Q36 ≥ 1) were classified as current pipe or hookah users. Past-30-day users also had to indicate that they had used a pipe or hookah in the past 12 months (Q35 = yes) to be presented with Q36. This measure was modified from the NHIS (CDC, 2019a).

Past-year drug use (Q40). Respondents who reported that they had used any of the substances assessed in subitems Q40a through Q40e were classified as using any drugs in the past year. The five drug categories marijuana, synthetic cannabis, inhalants to get high, synthetic stimulants, and other illegal drugs. These drug use categories were comparable to the 2015 HRBS (Meadows et al., 2018).

Past-year marijuana or synthetic cannabis use (Q40a, Q40b). Respondents who reported that they had used any marijuana or hashish in item Q40a and/or any synthetic cannabis in item Q40b were classified as using marijuana in the past year.

Past-year drug use other than marijuana (Q40c–Q40e). Respondents who reported that they had used any of the substances assessed in subitems Q40c through Q40e was classified as using any drugs other than marijuana in the past year.

Past-year nonprescription cough or cold medicine use (Q40f). Respondents who reported that they had used nonprescription cough or cold medicine to get high in subitem Q40f were classified as using nonprescription cough or cold medicine in the past year.

Past-year nonprescription anabolic steroids (Q40g). Respondents who reported that they had used nonprescription anabolic steroids in subitem Q40g were classified as using nonprescription steroids in the past year.

Past-year prescription drug use (Q43). Respondents who said yes to any of items Q43a through Q43c were categorized as having used any prescription drugs in the past year. We also reported on the proportion who indicated yes to each of these items separately. This measure was modified from the 2015 HRBS (Meadows et al., 2018).

Past-year prescription drug misuse (Q44). Respondents who said yes to any of items Q44a through Q44c were categorized as having misused any prescription drugs in the past year. Note that only those who responded yes to corresponding items Q43a through Q43c received items Q44a through Q44c. This measure was modified from the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a).

Chapter Six: Mental and Emotional and Health

Serious psychological distress (past 30 days: Q55; past 12 months: Q56, Q57). Respondents completed the K6 scale (Kessler, Andrews, et al., 2002; Kessler, Barker, et al., 2003), a self-administered brief measure of serious psychological distress that is widely used in general population surveys. The K6 ascertained how much of the time service members had experienced common symptoms of nonspecific psychological distress (five-point response scale: none of the time to all of the time) in the past 30 days (Q55) or the past 12 months (Q56, Q57). Symptoms include the following: feeling "so sad that nothing could cheer you up," feeling nervous, feeling restless or fidgety, feeling hopeless, feeling that everything was an effort, or feeling worthless (e.g., Q55a–Q55f). Respondents were asked if there was a month in the past 12 months during which they felt more depressed, anxious, or emotionally stressed than they had during the past 30 days (Q56); if yes (Q56 = 1), respondents were asked to rate their symptoms during the month that they felt the worst (Q57). Scores of 13 or higher on the K6 indicate serious psychological distress and discriminate highly between individuals with and without a clinical diagnosis of serious mental illness in the general population (Kessler, Barker, et al., 2003; Kessler, Berglund, et al., 2004). Respondents with sum scores greater than or equal to 13 were categorized as having serious psychological distress during the past 30 days (Q55) and/or during the past 12 months (Q57); respondents with sum scores greater than or equal to 8 were categorized as having moderate psychological distress during the past 30 days (Q55) and/or during the past 12 months (Q57). The K6 replaces items from the PHQ-9 (probable depression) and GAD-7 (probable generalized anxiety disorder) that were included in the 2015 HRBS.

Aggressive behavior (Q58). To assess levels of aggressive behavior, respondents were asked to report how often in the past 30 days they had expressed anger in explosive or aggressive ways, as illustrated in four scenarios (e.g., threatened someone with physical violence, got angry at someone and yelled or shouted at them) (Q58a–Q58d). Responses for each item ranged from never to five or more times in the past 30 days. This four-item measure has been used extensively in the Army's Land Combat Study to characterize aggressive behavior among service members (see, for example, Killgore et al., 2008; Thomas et al., 2010; Wilk et al., 2013). Two categories of aggressive behavior were calculated based on responses. If personnel responded that they had expressed any of the behaviors at least once, they were categorized as showing any aggressive behavior in the past 30 days. If personnel responded that they had expressed any of the behaviors five or more times, they were categorized as showing aggressive behavior 5+ times in the past 30 days.

Unwanted sexual contact (Q64, Q65). To assess experience of unwanted sexual experiences among service members since joining the military, respondents were asked if they had experienced a time "when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you" or any sexual contact (i.e., "sexual touching as well as oral, anal or vaginal penetration") when they did not consent or could not consent. If respondents answered yes (Q64 = 1), a follow-up question asked whether the unwanted sexual contact had occurred during the past 12 months. These items were modified from those used in the 2015 HRBS to focus exclusively on experiences that had occurred since joining the military and during the past 12 months (lifetime experience of unwanted sexual contact is no longer asked) and to more clearly define unwanted sexual contact. These items cannot be directly compared with other civilian or military surveys, including the WGRA and the WGRR.

Physical abuse (Q66, Q67). To assess experiences of physical abuse since joining the military, respondents were asked whether they had ever been "physically abused, punished, or beaten such that you received bruises, cuts, welts, lumps, or other injuries?" If respondents answered yes (Q66 = 1), a follow-up question asked if the physical abuse had occurred during the past 12 months. These items were refined from those used in the 2015 HRBS to focus exclusively on experiences that have occurred since joining the military and during the past 12 months (lifetime experience of physical abuse is no longer asked in the 2018 HRBS).

Probable PTSD (Q68, Q69). To assess probable PTSD, respondents were asked to complete the PC-PTSD-5 (Prins et al., 2016). The PC-PTSD-5 is a brief, standardized rating scale for PTSD. Respondents were first asked whether they had experienced a traumatic event in their lifetime (Q68). If yes (Q68 = 1), respondents were asked whether in the past month (or 30 days) they had experienced five symptoms that correspond to cardinal symptoms of PTSD (nightmares, re-experiencing, and/or intrusive thoughts about the event; avoidance; hypervigilance; emotion numbness; persistent feelings of guilt or blame surrounding the event). The PC-PTSD-5 is a revised version of the original Primary Care PTSD Screen (Prins et al., 2004), which was developed to more closely correspond to DSM-5 diagnostic criteria for PTSD. The PC-PTSD-5 has a variety of purposes, including screening individuals for PTSD in clinical settings, diagnosis, and monitoring symptom change during and after treatment. Past research has shown that the Primary Care PTSD Screen (on which the PC-PTSD-5 is based) performs similarly to longer PTSD screening measures (i.e., PCL-C; Bliese et al., 2008). A preliminary validation study conducted with a sample of 398 veterans also showed that the PC-PTSD-5 had excellent predictive utility with respect to clinical diagnosis of PTSD (Prins et al., 2016). The PC-PTSD-5 replaces the 17-item PCL-C, which was included in the 2015 HRBS. Respondents with sum scores greater than or equal to 3 were categorized as having probable PTSD.

Suicide ideation (Q77), suicide plans (Q78), and suicide attempts (Q79). Respondents were asked whether they had seriously thought about trying to kill themselves in the past 12 months ("At any time in the PAST 12 MONTHS, did you seriously think about trying to kill yourself?"; Q77). Respondents who indicated that they had seriously thought about trying to kill themselves (Q77 = 1) were then asked whether they had made any plans to kill themselves in the past 12 months. Respondents who reported suicide ideation (Q77 = 1) were also asked, "During the PAST 12 MONTHS, did you try to kill yourself?" These items were refined from the 2015 HRBS; they now focus exclusively on experiences during the past 12 months and map directly to questions from the NSDUH (Substance Abuse and Mental Health Services Administration, 2019a).

Problem gambling (Q95, Q96). The Lie-Bet Questionnaire (Johnson et al., 1997) was used to assess problem gambling. The questionnaire consists of two questions about lifetime experience of problems associated with gambling. The questions ask whether respondents have (1) "ever felt the need to bet more and more money?" or (2) "ever had to lie to people important to you about how much you gambled?" Respondents who answered yes to either of these items were considered to have problem gambling. Problem gambling has not been assessed in prior years of the HRBS.

Mental health treatment utilization (Q70–73). A series of questions assessed respondents' utilization of mental health services within the past 12 months. Respondents were asked to indicate whether they had received treatment for "problems with stress, your emotions, or mental health, or for problems with your use of alcohol or drugs" from different types of providers (mental health provider; general medical provider; chaplain, clergy, or pastor) (Q70a–Q70c). If individuals indicated that they had received treatment for a mental health or substance use–related problem from a given type of provider (Q70a–Q70c = 1), they were subsequently asked to indicate the setting (military facility; VA facility; non-VA civilian facility) in which they received that treatment (Q71a-c). Respondents who indicated that they had received treatment in the past 12 months (Q70a–Q70c = 1 and Q71a–Q71c = 1) were then asked to indicate the number of times that they had seen a provider in the past 12 months for each applicable provider type/setting combination (Q72a–Q72i). All individuals were asked whether they had taken any prescribed medication to treat a mental health or substance use problem (Q73). These items have been refined from similar items included in the 2015 HRBS, such that the number of response options has been reduced by combining similar provider categories (Q70) and settings (Q71), and the items now focus exclusively on treatment within the past 12 months.

Unmet mental health need (Q74, Q75). Respondents were asked to indicate whether, during the past 12 months, there was ever a time when they "needed treatment for an emotional or mental health problem or for your use of alcohol or drugs but did not get it" (Q74). This item replaces two separate items pertaining to perceived mental health treatment need on the 2015 HRBS and is slightly modified from a similar item included in the NSDUH which has been used in the research literature. Individuals who indicated that they needed treatment in the past 12 months but did not get it (Q74 = 1) were asked to indicate reasons why they did not pursue treatment (Q75). In addition, individuals with sum scores of 8 or higher on the K6 (i.e., those with moderate psychological distress) who did not indicate receiving mental health treatments in the past 12 months were asked to indicate reasons for not getting mental health treatment (Q75). Response options included "I did not think treatment would help," "It would have harmed my career," "I could not afford the cost," and "I did not think I needed it," among others (Q75a–Q75n). Question wording and response options were modified from a comparable item on the 2015 HRBS to accommodate changes to the survey skip patterns that determined which respondents received this item.

Belief that mental health services would damage a person's career (Q76). Respondents were asked to indicate whether they believed that seeking mental health would harm an individual's career based on the following question: "In general, do you think it would damage a person's military career if the person were to seek counseling or mental health therapy/treatment through the military, regardless of the reason for seeking counseling?" This item was previously included in the 2015 HRBS.

Chapter Seven: Physical Health and Functioning

Physician-diagnosed chronic conditions (Q14). Prevalence of each condition was calculated based on the proportion of respondents who responded yes for each of the subitems (Q14a–Q14h = 1). A variable was also developed to indicate the total number of conditions each respon-

dent endorsed as yes using the following categories: no conditions; 1–2 conditions; 3+ conditions. This measure was modified from the BRFSS (CDC, 2018c).

Physical symptoms (Q16). The proportion of respondents indicating that they were "bothered a lot" by each symptom was calculated. In addition, two pain-related variables were derived. The first variable reflected individuals who reported that they were "bothered a lot" by back pain or pain in the arms, legs, or joints (Q16b, Q16c). The second variable included individuals who reported that that they were "bothered a lot" by back pain; pain in the arms, legs, or joints; or headaches (Q16b, Q16c, or Q16d). Finally, a variable was derived to reflect high physical symptom severity. First, each symptom was assigned a score of 0 (not bothered at all), 1 (bothered a little bit), or 2 (bothered a lot). The values were added across all eight symptoms (score range = 0–16). Respondents whose summary score was 8 or more were categorized as having high physical symptom severity. This measure was modified from the Patient Health Questionnaire-15 (Kroenke et al., 2002).

Injury (Q61). The proportion of individuals reporting that they had experienced any of the injuries listed in this item were identified as having experienced an injury in the past 12 months. This item was modified from the Brief Traumatic Brain Injury Screen (Schwab et al., 2006).

TBI (Q62). Respondents who answered that they had experienced an injury in Q61 and indicated that, as a result of the event, they lost consciousness or got "knocked out" for less than a minute (Q62a = 1); lost consciousness or got "knocked out" for 1 to 20 minutes (Q62b = 1); felt dazed, confused, or "saw stars" (Q62d = 1); or didn't remember the event (Q62e = 1) were categorized as screening positive for probable mTBI. Respondents who answered that they had an injury in Q61 and indicated that they lost consciousness or got "knocked out" for more than 20 minutes (Q62c = 1) were categorized as screening positive for probable moderate to severe TBI. Individuals who did not experience an injury in Q61 were coded as not screening positive for TBI. This item was modified from the Brief Traumatic Brain Injury Screen (Schwab et al., 2006).

Postconcussive symptoms (Q63). A positive screen for postconcussive symptoms required a positive screen for mTBI or moderate to severe TBI (Q61 and Q62; see above) and either (1) endorsement of four or more of the symptoms in Q63 (headaches, dizziness, memory problems or lapses, balance problems, ringing in the ears, irritability, sleep problems, sensitivity to light) or (2) a positive response for "concussion or symptoms of a concussion (such as headache, dizziness, irritability)" in Q62. Individuals who did not experience an injury in Q61 were coded as not experiencing postconcussive symptoms. This item was modified from the Brief Traumatic Brain Injury Screen (Schwab et al., 2006).

Self-rated health (Q15). The proportion of respondents endorsing each category (excellent, very good, good, fair, poor) was calculated. This item is from the SF-36 (Ware and Sherbourne, 1992).

Absenteeism and presenteeism (Q60). For absenteeism, the mean number of days (out of the past 30) that symptoms caused the respondent to miss work or school was calculated (Q60a). For presenteeism, the mean number of days that symptoms caused the respondent to experience

reduced productivity was calculated (Q60b). These measures are from the Sheehan Disability Scale (Sheehan, Harnett-Sheehan, and Raj, 1996).

Chapter Eight: Sexual Behavior and Health

More than one sex partner in the past 12 months (Q46). The item was adapted from the 2010 National HIV Behavioral Surveillance System Questionnaire. A version appeared in the 2015 HRBS with slightly different response options but was used to derive a comparable measure. Respondents providing a response of at least two people (Q46 ≤ 3) were categorized as having more than one sex partner in the past 12 months.

Past-year sex with a new sex partner without using a condom (Q47). The item appeared in the 2015 HRBS. Those who gave responses of never, seldom, sometimes, or often (Q47 = 2, 3, 4, or 5) were categorized as having sex with a new partner without using a condom.

Used a condom during most-recent vaginal sex (Q50). This measure was used in the 2015 HRBS. Respondents were asked whether they used any form of birth control the most-recent time they had vaginal sex. Those who responded "yes, condoms" (Q50 = 11) were categorized as using a condom during their most-recent vaginal sex.

Used highly effective contraception, other contraception, or no contraception during most-recent vaginal sex (Q50). This item was in the 2015 HRBS, and a comparable measure derived, but highly effective contraception was labeled "used sterilization or long-acting contraception," and "other contraception" was labeled "short-acting contraception" in 2015. Those who were pregnant or trying to become pregnant were excluded from the "no contraception" category.

Method of contraception at time of past-year unintended pregnancy (Q52). This item and measure were new to the 2018 HRBS. Respondents were asked whether they had used any form of birth control the most-recent time they had vaginal sex. Those responding "yes, female sterilization" (Q52 = 2); "yes, male sterilization" (Q52 = 3); "yes, an IUD" (Q52 = 4); or "yes, a contraceptive implant" (Q52 = 5) were classified as using highly effective contraception. Those responding with "yes, birth control pills" (Q52 = 6); "yes, birth control shots, birth control patch, contraceptive ring, or a diaphragm" (Q52 = 7); "yes, condoms" (Q52 = 8); or "yes, some other method" (Q52 = 9) were classified as using "other contraception," and those responding "no, we were not using any form of birth control" (Q52 = 1) were categorized as not using any method of contraception during their most-recent vaginal sex. Individuals using *both* highly effective and other contraception were categorized as using highly effective contraception.

Past-year unintended pregnancy (Q51). Respondents were asked whether they caused or had an unintended pregnancy in the past 12 months. Those responding yes (Q51 = 1) were categorized as causing or experiencing an unintended pregnancy in the past year.

Past-year unintended pregnancy during deployment (Q85). Questions for deriving this variable were asked only for those who had a past-year unintended pregnancy and a past-year deployment (Q84 > 1). This group was asked whether their unintended pregnancy had occurred

during the deployment. If Q85 = 1 (yes), respondents were categorized as having a past-year unintended pregnancy during employment. All those who responded no or who did not have an unintended pregnancy or a past-year deployment were categorized as not having a past-year unintended pregnancy during deployment.

Contraceptive counseling prior to deployment (Q86). This variable was defined only for those with a past-year deployment (Q84 > 1). Respondents were asked whether a provider from the Military Health System had talked with them, prior to deploying, about using birth control in a deployed environment. Those responding yes (Q86 = 1) were classified as getting such counseling prior to deployment.

Could not access preferred contraception prior to deployment (Q87). This variable was defined only for those with a past-year deployment (Q84 > 1) and who had tried to get birth control prior to that deployment (Q87 < 3). Those indicating that they could get or refill their preferred method (Q87 = 1) were classified as such.

Could not access preferred contraception during deployment (Q88). This variable was defined only for those with a past-year deployment (Q84 > 1) and who had tried to get birth control during that deployment (Q88 < 3). Those indicating that they could get or refill their preferred method (Q88 = 1) were classified as such.

Past-year HIV test (Q53). Past-year HIV test was derived comparably to the 2015 measure of this construct. (Q53 was asked as part of the 2015 HRBS, with slightly different response options.) Respondents were asked when their last HIV test occurred. Those responding "within the past 6 months" (Q53 = 1) or "more than 6 months ago but within the past 12 months" (Q53 = 2) were categorized as having an HIV test in the past year.

Past-six-months HIV test (Q53). Q53 was asked as part of the 2015 HRBS, with slightly different response options. The derived past-six-months measure based on it is new to the HRBS in 2018. Respondents were asked when their last HIV test occurred. Those responding "within the past 6 months" (Q53 = 1) were categorized as having an HIV test in the past six months.

Past-year STI (Q54). This is a revision of an item from the 2015 HRBS yielding a comparable derived variable. Respondents were asked whether in the past 12 months they had an STI. Those responding yes (Q54 = 1) were categorized as having a past-year STI.

Men who had sex with men in the past year (DMDC gender, same-sex activity). Service members whose gender was male and met criteria for same-sex activity (see Chapter Nine derived variables) were categorized as men who had sex with men. This measure differs from that used by the 2015 HRBS only in the use of DMDC gender rather than self-reported gender.

High risk for HIV infection (DMDC gender, Q46, Q54, men who had sex with men in the past year). Those at high risk for HIV infection were defined as those who had vaginal or anal sex with more than one partner in the past year (Q46 ≤ 3), who had a past-year STI (Q54 = 1), or who were classified as men who had sex with men. The same measure was included in the 2015 HRBS.

Chapter Nine: Sexual Orientation and Health

Same-sex activity (DMDC gender, Q48, Q49). This measure was derived based on DMDC recorded gender, Q47 (sexual activity with male partners), and Q87 (sexual activity with female partners). Men providing any response to Q48 other than "no male partners in the past 12 months" (Q48 = 4) were categorized as having one or more same-sex partners. All other men responding to Q48 were categorized as not having such a partner. Women providing any response to Q49 other than "no female partners in the past 12 months" (Q49 = 4) were categorized as having one or more same-sex partners. All other women responding to Q49 were categorized as not having such a partner. Q48, Q49 were used to derive a comparable measure in the 2015 HRBS, but these questions were revised in 2018 to include fewer response options. In addition, the 2015 HRBS used self-reported rather than DMDC gender to derive same-sex activity.

Sexual identity (Q89). This item was chosen based on recommendations by the Sexual Minority Assessment Research Team expert panel (Sexual Minority Assessment Research Team, 2009). Service members giving a response of "gay or lesbian" (Q89 = 2) or "bisexual" (Q89 = 3) were categorized as LGB. Sexual identity was measured in the same way in the 2015 HRBS (Meadows et al., 2018).

Chapter Ten: Deployment Experience and Health

Lifetime number of deployments (Q80). All service members were asked to identify the number of times they had been deployed while serving in the military, to include both combat and noncombat deployments. Response options included 1 time, 2 times, 3 or more times, and "I have never been deployed." Those service members who indicated that they had never deployed were skipped out of the rest of the deployment section survey items.

Lifetime number of combat deployments (Q82). Service members who had prior deployment experience were asked how many combat zone deployments they had been on. The survey defined combat zone deployments as "a deployment where you received imminent danger pay (IDP), hazardous duty pay, and/or combat zone tax exclusion benefits." This definition is similar to the one used in DMDC's Status of Forces Survey. Response options included "I have not had any combat zone deployments," 1 deployment, 2 deployments, and 3 or more deployments.

Lifetime duration of deployments (Q81). Service members who had prior deployment experience were asked how long in total they had been deployed, to include both combat and noncombat deployments. Response options included 1–6 months, 7–12 months, 13–24 months, 25–48 months, and 49 months or more.

Duration of recent deployments (Q84). Service members who had prior deployment experience were asked how many months they had been deployed in the past 12 months, to include both combat and noncombat deployments. Response options included "I did not deploy in the past 12 months," less than one month, 1–3 months, 4–6 months, 7–9 months, and 10–12 months.

Lifetime combat trauma exposure (Q83). Service members who had ever deployed (to include both combat and noncombat deployments) were asked to indicate whether they had experienced six different traumas. The list of experiences is based on the 2015 HRBS; however, it only uses those items that independently predicted a set of deployment-related health conditions (e.g., probable PTSD and probable major depression) in a regression model using data from the 2015 HRBS. The final set of six items asks about working with landmines or unexploded ordnance, witnessing members of one's own unit being seriously wounded or killed, knowing someone who was killed in combat, witnessing acts of violence or excessive force that violated rules of engagement, being wounded in combat, and witnessing civilians being seriously wounded or killed.

APPENDIX D

Key Outcomes by Race/Ethnicity and Age Group

This appendix provides the key outcomes described in Chapters Three through Ten by race/ethnicity and age group.

Chapter Four: Health Promotion and Disease Prevention

Weight Status

Table D.1
Weight Status, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
HP2020					
Obesity among those age 20+ (HP2020 target: <30.5 percent)	18.2%[b,c,d] (17.0–19.3)	23.0%[a,d,e] (20.3–25.8)	22.3%[a,d,e] (19.7–25.0)	12.7%[a,b,c] (9.9–15.6)	13.1%[b,c] (9.4–16.8)
Normal weight among those age 20+ (HP2020 target: >33.9 percent)	31.2%[c,d] (29.9–32.6)	32.2%[c,d] (29.1–35.2)	25.4%[a,b,d] (22.3–28.4)	43.6%[a,b,c] (38.9–48.3)	34.2% (27.5–40.9)
Weight categories					
Underweight[z]	0.6% (0.3–0.9)	0.5% (0.0–1.1)	0.4% (0.1–0.8)	0.9% (0.2–1.6)	0.2% (0.0–0.4)
Normal weight	33.9%[c,d] (32.4–35.3)	35.0%[d] (31.8–38.2)	28.8%[a,d] (25.7–31.9)	46.1%[a,b,c] (41.5–50.8)	35.4% (28.8–42.0)
Overweight	48.1%[b,d] (46.6–49.6)	42.8%[a,c] (39.7–46.0)	49.6%[b,d] (46.4–52.9)	40.9%[a,c] (36.5–45.2)	51.7% (44.9–58.4)
Obese	17.4%[b,d] (16.3–18.5)	21.7%[a,d,e] (19.1–24.3)	21.1%[d,e] (18.5–23.7)	12.1%[a,b,c] (9.4–14.9)	12.8%[b,c] (9.2–16.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.2
Weight Status, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
HP2020				
Obesity among those age 20+ (HP2020 target: <30.5 percent)	11.6%[b,c,d] (9.2–14.0)	17.9%[a,c,d] (16.3–19.6)	23.2%[a,b,d] (21.8–24.7)	27.3%[a,b,c] (25.9–28.8)
Normal weight among those age 20+ (HP2020 target: >33.9 percent)	47.4%[b,c,d] (44.1–50.8)	33.1%[a,c,d] (31.2–34.9)	21.6%[a,b,d] (20.4–22.9)	16.7%[a,b,c] (15.6–17.9)
Weight categories				
Underweight	1.3%[b,c,d] (0.6–2.0)	0.4%[a] (0.2–0.6)	0.2%[a] (0.1–0.3)	0.2%[a] (0.1–0.4)
Normal weight	54.1%[b,c,d] (51.0–57.1)	33.1%[a,c,d] (31.2–34.9)	21.6%[a,b,d] (20.4–22.9)	16.7%[a,b,c] (15.6–17.9)
Overweight	34.7%[b,c,d] (31.8–37.7)	48.6%[a,c,d] (46.6–50.6)	54.9%[a,b] (53.3–56.6)	55.7%[a,b] (54.1–57.3)
Obese	9.9%[b,c,d] (7.9–11.9)	17.9%[a,c,d] (16.3–19.6)	23.2%[a,b,d] (21.8–24.7)	27.3%[a,b,c] (25.9–28.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Physical Activity

Moderate and Vigorous Physical Activity

Table D.3
Physical Activity Last 30 Days, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
HP2020					
Medium physical activity level (150 mins MPA or 75 mins VPA; HP2020 target: ≥47.9 percent)	68.4%[b,d] (67.1–69.8)	63.7%[a] (60.6–66.8)	67.2% (64.3–70.2)	61.7%[a] (57.0–66.3)	68.4% (62.3–74.5)
High physical activity level (300 mins MPA or 150 mins VPA; HP2020 target: ≥31.3 percent)[x]	42.8% (41.3–44.3)	38.5% (35.4–41.7)	40.9% (37.7–44.1)	37.6% (33.3–41.9)	42.2% (35.5–49.0)
MPA					
<150 mins/week	38.7%[d] (37.3–40.1)	42.6% (39.4–45.8)	39.9% (36.8–43.0)	45.4%[a] (40.7–50.0)	38.3% (31.9–44.8)
150–299 mins/week[z]	37.8% (36.3–39.2)	37.7% (34.6–40.8)	40.6% (37.3–43.8)	36.8% (32.6–41.1)	38.8% (32.0–45.6)
300+ mins/week	23.5%[d] (22.2–24.9)	19.7% (17.1–22.4)	19.6% (16.9–22.2)	17.8%[a] (14.5–21.1)	22.8% (17.2–28.5)
VPA					
<75 mins/week	56.5%[b] (55.0–58.0)	61.7%[a] (58.6–64.9)	58.1% (54.9–61.3)	61.8% (57.5–66.1)	60.3% (53.6–67.0)
75–149 mins/week[z]	8.6% (7.8–9.4)	7.3% (5.8–8.9)	8.0% (5.9–10.1)	6.1% (4.1–8.0)	6.4% (3.8–9.0)
150+ mins/week[z]	35.0% (33.5–36.4)	31.0% (27.9–34.0)	33.9% (30.8–36.9)	32.1% (28.0–36.2)	33.3% (26.7–39.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.4
Physical Activity Last 30 Days, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
HP2020				
Medium physical activity level (150 mins MPA or 75 mins VPA; HP2020 target: ≥47.9 percent)	70.3%[c,d] (67.5–73.0)	67.4%[d] (65.5–69.3)	65.0%[a] (63.4–66.5)	64.1%[a,b] (62.6–65.6)
High physical activity level (300 mins MPA or 150 mins VPA; HP2020 target: ≥31.3 percent)	45.0%[c,d] (42.0–48.1)	43.1%[c,d] (41.1–45.1)	38.7%[a,b,d] (37.1–40.2)	35.4%[a,b,c] (33.9–36.9)
MPA				
<150 mins/week	35.6%[c,d] (32.7–38.5)	38.9%[c,d] (37.0–40.9)	43.5%[a,b] (41.9–45.1)	44.4%[a,b] (42.8–46.0)
150–299 mins/week[z]	37.7% (34.7–40.7)	37.8% (35.9–39.7)	38.8% (37.2–40.4)	38.7% (37.1–40.2)
300+ mins/week	26.7%[c,d] (23.9–29.4)	23.3%[c,d] (21.6–25.0)	17.7%[a,b] (16.5–19.0)	16.9%[a,b] (15.7–18.1)
VPA				
<75 mins/week	56.1%[d] (53.1–59.1)	56.5%[d] (54.5–58.4)	58.8%[d] (57.3–60.4)	63.6%[a,b,c] (62.1–65.1)
75–149 mins/week[z]	7.6% (5.9–9.2)	8.4% (7.3–9.5)	8.1% (7.3–9.0)	8.5% (7.6–9.5)
150+ mins/week	36.3%[d] (33.4–39.3)	35.1%[d] (33.2–37.0)	33.0%[d] (31.5–34.5)	27.9%[a,b,c] (26.5–29.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Strength Training

Table D.5
Strength Training in Past 30 Days, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
HP2020					
Muscle-strengthening activities on 3+ days/week (HP2020 target [2+ days/week]: 24.1%)[q]	42.9% (41.4–44.3)	39.8%[c] (36.6–42.9)	47.1%[b] (43.9–50.4)	46.0% (41.5–50.6)	44.1% (37.4–50.9)
Strength training					
<1 day/week	31.0%[d] (29.6–32.4)	35.5%[c,d] (32.4–38.7)	28.6%[b] (25.8–31.4)	23.8%[a,b] (20.2–27.4)	26.4% (20.6–32.2)
1–2 days/week[z]	26.1% (24.9–27.4)	24.7% (22.0–27.4)	24.2% (21.5–26.9)	30.2% (25.7–34.7)	29.5% (23.2–35.7)
3+ days/week	42.9% (41.4–44.3)	39.8%[c] (36.6–42.9)	47.1%[b] (43.9–50.4)	46.0% (41.5–50.6)	44.1% (37.4–50.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[q] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated this way. Instead, it represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.6
Strength Training in Past 30 Days, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
HP2020				
Muscle-strengthening activities on 3+ days/week (HP2020 target [2+ days/week]: 24.1%)[q]	47.2%[c,d] (44.1–50.2)	45.6%[c,d] (43.6–47.6)	40.2%[a,b,d] (38.7–41.8)	32.7%[a,b,c] (31.2–34.2)
Strength training				
<1 day/week	28.9%[d] (26.1–31.7)	29.0%[d] (27.2–30.8)	31.6%[d] (30.1–33.1)	39.2%[a,b,c] (37.7–40.8)
1–2 days/week	23.9%[c,d] (21.3–26.6)	25.4% (23.8–27.1)	28.2%[a] (26.7–29.6)	28.1%[a] (26.7–29.5)
3+ days/week	47.2%[c,d] (44.1–50.2)	45.6%[c,d] (43.6–47.6)	40.2%[a,b,d] (38.7–41.8)	32.7%[a,b,c] (31.2–34.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[q] The HP2020 goal is for two or more days per week, but the HRBS measure cannot be disaggregated this way. Instead, it represents strength training of three or more days per week, which thus underestimates the percentage of service members meeting the HP2020 goal.

Screen Time

Table D.7
Hours per Day of Screen Time, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
< 1 hour per day	9.2%[c,d] (8.4–10.0)	6.8% (5.2–8.4)	6.4%[a] (5.1–7.7)	5.4%[a] (3.8–7.1)	5.6% (3.5–7.6)
1–4 hours per day	68.2%[b] (66.8–69.6)	57.0%[a,c] (53.8–60.2)	63.8%[b] (60.7–66.8)	62.3% (58.0–66.6)	63.9% (57.0–70.8)
5+ hours per day	22.6%[b,c,d] (21.3–24.0)	36.2%[a,c] (33.1–39.3)	29.8%[a,b] (26.9–32.7)	32.3%[a] (28.1–36.5)	30.5% (23.5–37.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

Table D.8
Hours per Day of Screen Time, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
< 1 hour per day	5.1%[c,d] (3.7–6.6)	7.6%[c,d] (6.6–8.6)	9.7%[a,b,d] (8.8–10.6)	13.5%[a,b,c] (12.5–14.6)
1–4 hours per day	61.7%[b,c] (58.7–64.7)	66.8%[a] (64.9–68.6)	68.3%,[a,d] (66.8–69.8)	64.8%[c] (63.3–66.3)
5+ hours per day	33.2%[b,c,d] (30.3–36.1)	25.6%[a,c,d] (23.9–27.4)	22.1%[a,b] (20.7–23.4)	21.6%[a,b] (20.4–22.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Routine Physical Assessment

Table D.9
Past-Year Routine Medical Checkup, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Routine checkup in past year	72.6%[d] (71.2–74.1)	72.0%[d] (68.9–75.1)	68.6% (65.5–71.8)	63.0%[a,b,e] (58.2–67.7)	76.2%[d] (69.5–82.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

Table D.10
Past-Year Routine Medical Checkup, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Routine checkup in past year	60.4%[b,c,d] (57.4–63.4)	70.1%[a,c,d] (68.2–72.0)	79.0%[a,b,d] (77.7–80.4)	86.1%[a,b,c] (85.0–87.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Health Insurance

Table D.11
Current Health Insurance, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Currently covered by any type of health insurance	93.9%[b,c,d] (92.9–94.9)	88.7%[a,e] (86.3–91.0)	87.1%[a,e] (84.6–89.6)	88.4%[a] (83.9–92.8)	95.9%[b,c] (93.1–98.8)
Currently covered by TRICARE or other military health insurance	60.2% (58.7–61.7)	64.1%[c] (60.8–67.4)	56.4%[b] (53.0–59.9)	63.7% (59.4–67.9)	63.9% (56.9–71.0)
Currently covered by VA, including CHAMPVA health insurance[z]	15.1% (14.1–16.1)	13.5% (11.6–15.4)	16.0% (13.9–18.2)	11.4% (9.0–13.8)	15.9% (10.8–20.9)
Currently covered by private health insurance	46.5%[b,c] (45.0–48.0)	36.7%[a] (33.5–39.9)	41.2%[a] (37.8–44.5)	42.7% (38.3–47.0)	41.4% (34.6–48.3)
Currently covered by government health insurance for lower-income individuals	3.0%[b,c,d] (2.3–3.6)	10.2%[a] (7.4–12.9)	7.9%[a] (5.9–9.8)	7.8%[a] (5.0–10.6)	3.7% (0.9–6.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.12
Current Health Insurance, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Currently covered by any type of health insurance	84.9%[b,c,d] (82.5–87.3)	92.5%[a,c,d] (91.2–93.8)	96.7%[a,b] (96.0–97.3)	97.1%[a,b] (96.4–97.7)
Currently covered by TRICARE or other military health insurance	47.4%[b,c,d] (44.2–50.6)	66.5%[a,d] (64.5–68.4)	66.1%[a,d] (64.6–67.7)	59.2%[a,b,c] (57.7–60.8)
Currently covered by VA, including CHAMPVA health insurance	2.7%[b,c,d] (1.6–3.7)	15.7%[a,c,d] (14.2–17.2)	21.9%[a,b] (20.5–23.3)	22.2%[a,b] (20.8–23.6)
Currently covered by private health insurance	50.1% [b,c] (46.9–53.3)	38.1%[a,c,d] (36.2–40.1)	43.1%[a,b,d] (41.4–44.7)	50.6%[b,c] (49.0–52.2)
Currently covered by government health insurance for lower-income individuals	12.1%[b,c,d] (9.8–14.4)	3.6%[a,c,d] (2.8–4.4)	1.2%[a,b] (0.8–1.5)	1.8%[a,b] (1.3–2.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Sleep Health

Average Daily Amount of Sleep

Table D.13
Past-30-Days Average Daily Hours of Sleep, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
HP2020					
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 target: 72.8%)	47.2%[b] (45.7–48.6)	38.8%[a,d] (35.7–42.0)	43.5% (40.2–46.7)	48.2%[b] (43.6–52.8)	43.5% (36.8–50.2)
Hours of sleep per 24-hour period					
≤ 4 hours	5.4%[b,c] (4.6–6.1)	8.4%[a] (6.8–10.0)	8.0%[a] (6.3–9.8)	5.7% (3.9–7.4)	9.9% (5.5–14.3)
5–6 hours[z]	45.1% (43.7–46.6)	49.1% (45.9–52.3)	45.8% (42.6–49.0)	43.2% (38.8–47.6)	45.6% (38.8–52.3)
7+ hours	49.5%[b] (48.0–51.0)	42.5%[a,d] (39.3–45.8)	46.2% (43.0–49.5)	51.2%[b] (46.6–55.7)	44.5% (37.8–51.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.14
Past-30-Days Average Daily Hours of Sleep, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
HP2020				
8 hours per 24-hour period for those 18–21 years of age, 7 hours per 24-hour period for those older than 21 (HP2020 target: 72.8%)	48.7%[c,d] (45.7–51.8)	45.5%[c] (43.6–47.5)	41.8%[a,b] (40.2–43.4)	44.2%[a] (42.6–45.7)
Hours of sleep per 24-hour period				
≤ 4 hours	4.8%[c] (3.3–6.2)	6.5% (5.5–7.6)	7.8%[a] (6.9–8.8)	6.3% (5.5–7.1)
5–6 hours	37.0%[b,c,d] (34.1–39.9)	48.0%[a] (46.0–49.9)	50.4%[a] (48.8–52.0)	49.5%[a] (47.9–51.1)
7+ hours	58.2%[b,c,d] (55.2–61.2)	45.5%[a,c] (43.6–47.5)	41.8%[a,b] (40.2–43.4)	44.2%[a] (42.6–45.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from E1–E4 estimate.

[b] Statistically significantly different from E5–E6 estimate.

[c] Statistically significantly different from E7–E9 estimate.

[d] Statistically significantly different from W1–W5 estimate.

Sleep Quality

Table D.15
Past-30-Day Sleep Quality, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Very good[z]	15.1% (14.0–16.2)	18.3% (15.5–21.1)	16.6% (14.3–19.0)	16.6% (13.4–19.8)	12.2% (7.6–16.7)
Fairly good	59.9% (58.5–61.4)	55.4%[d] (52.2–58.6)	57.3% (54.1–60.4)	63.3%[b] (59.0–67.5)	57.4% (50.6–64.2)
Fairly bad[z]	21.5% (20.3–22.7)	20.9% (18.4–23.4)	21.3% (18.9–23.8)	17.7% (14.5–20.8)	26.6% (20.4–32.9)
Very bad	3.5%[b] (2.9–4.1)	5.5%[a,d] (4.2–6.8)	4.7% (3.4–6.1)	2.5%[b] (1.3–3.7)	3.8% (1.1–6.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.16
Past-30-Day Sleep Quality, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Very good	19.2%[b,c] (16.7–21.7)	14.9%[a] (13.4–16.4)	13.2%[a,d] (12.1–14.2)	15.9%[c] (14.7–17.0)
Fairly good	61.6%[d] (58.7–64.6)	58.8% (56.8–60.8)	57.2% (55.6–58.8)	57.0%[a] (55.4–58.6)
Fairly bad	15.8%[b,c,d] (13.6–18.0)	22.4%[a] (20.7–24.1)	25.2%[a] (23.7–26.6)	23.2%[a] (21.8–24.5)
Very bad[z]	3.4% (2.2–4.6)	3.9% (3.2–4.7)	4.4% (3.7–5.2)	4.0% (3.4–4.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Lack of Energy Due to Poor Sleep

Table D.17
Moderate to Severe Lack of Energy Due to Poor Sleep, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Moderate to severe lack of energy due to poor sleep	18.1%[e] (17.0–19.2)	20.2% (17.8–22.6)	20.6% (18.2–23.0)	18.0% (13.7–22.3)	27.4%[a] (20.6–34.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[e] Statistically significantly different from Other estimate.

Table D.18
Moderate to Severe Lack of Energy Due to Poor Sleep, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Moderate to severe lack of energy due to poor sleep	14.9%[b,c,d] (12.8–17.0)	20.5%[a] (18.8–22.1)	21.4%[a,d] (20.1–22.8)	19.0%[a,c] (17.7–20.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Use of Medications to Sleep

Table D.19
Past-30-Day Use of Sleep Medication, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Never	83.7%[d] (82.6–84.7)	85.3%[d] (83.2–87.4)	85.6%[d] (83.6–87.6)	90.4%[a,b,c,e] (88.0–92.8)	78.7%[d] (73.0–84.5)
Occasionally (less than once per week, 1–2 times per week)	9.9%[d] (9.0–10.7)	8.8% (7.1–10.4)	8.7% (7.1–10.2)	5.4%[a,e] (3.6–7.1)	13.6%[d] (8.7–18.6)
Frequently (3 or more times per week)[z]	6.4% (5.7–7.1)	5.9% (4.6–7.2)	5.7% (4.5–7.0)	4.2% (2.5–5.9)	7.6% (4.1–11.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.20
Past-30-Day Use of Sleep Medication, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Never	89.6%[b,c,d] (87.8–91.4)	83.8%[a,d] (82.4–85.3)	81.4%[a] (80.1–82.7)	80.6%[a,b] (79.4–81.9)
Occasionally (less than once per week, 1–2 times per week)	7.6%[c] (6.1–9.2)	9.5% (8.4–10.6)	11.0%[a] (10.0–12.0)	10.0% (9.0–11.0)
Frequently (3 or more times per week)	2.8%[b,c,d] (1.9–3.7)	6.7%[a,d] (5.6–7.7)	7.6%[a,d] (6.7–8.4)	9.4%[a,b,c] (8.5–10.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Use of Substances to Stay Awake

Table D.21
Past-30-Day Use of Medications to Stay Awake, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Past-30-day use of energy drinks to stay awake					
Never	59.5%[b] (58.0–61.0)	71.3%[a,c,d,e] (68.4–74.2)	60.7%[b] (57.5–64.0)	61.3%[b] (56.5–66.1)	58.0%[b] (51.0–65.0)
1–2 times per week	27.8%[b] (26.4–29.2)	22.1%[a,c] (19.4–24.8)	28.8%[b] (25.8–31.9)	27.1% (23.0–31.1)	29.2% (22.6–35.8)
3 or more times per week	12.7%[b] (11.6–13.7)	6.5%[a,c,e] (5.0–8.1)	10.4%[b] (8.2–12.6)	11.6% (7.3–15.9)	12.9%[b] (7.5–18.2)
Past-30-day use of other caffeinated beverages to stay awake					
Never	23.9%[b,c] (22.6–25.1)	44.3%[a,c,d,e] (41.1–47.6)	29.4%[a,b,e] (26.4–32.3)	26.7%[b] (22.2–31.2)	20.3%[b,c] (15.2–25.3)
1–2 times per week	22.6%[b,c,d] (21.3–24.0)	29.9%[a] (27.0–32.8)	28.0%[a] (24.8–31.2)	29.2%[a] (25.1–33.2)	29.1% (22.4–35.9)
3 or more times per week	53.5%[b,c,d] (52.0–55.0)	25.8%[a,c,d,e] (23.3–28.4)	42.6%[a,b] (39.5–45.7)	44.1%[a,b] (39.7–48.6)	50.6%[b] (43.8–57.4)
Past-30-day use of OTC medications to stay awake					
Never[z]	97.1% (96.6–97.7)	96.3% (95.1–97.5)	97.1% (96.1–98.0)	96.5% (94.7–98.3)	96.3% (93.6–99.0)
1–2 times per week[z]	1.6% (1.2–2.0)	2.4% (1.5–3.4)	1.7% (0.9–2.5)	2.9% (1.4–4.3)	2.5% (0.1–5.0)
3 or more times per week[z]	1.3% (0.9–1.6)	1.2% (0.5–2.0)	1.3% (0.7–1.8)	0.6% (0.0–1.7)	1.2% (0.0–2.4)
Past-30-day use of prescription medications to stay awake					
Never[z]	97.0% (96.5–97.6)	96.7% (95.5–97.9)	97.8% (97.0–98.5)	97.6% (96.2–99.0)	96.8% (94.2–99.5)
1–2 times per week[z]	1.0% (0.6–1.3)	1.1% (0.4–1.9)	0.5% (0.1–0.8)	0.8% (0.1–1.5)	1.9% (0.0–4.2)
3 or more times per week[z]	2.0% (1.6–2.5)	2.2% (1.2–3.1)	1.7% (1.1–2.4)	1.6% (0.4–2.9)	1.3% (0.0–2.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.22
Past-30-Day Use of Medications to Stay Awake, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Past-30-day use of energy drinks to stay awake				
Never	57.6%[c,d] (54.5–60.6)	54.9%[c,d] (52.9–56.9)	65.9%[a,b,d] (64.3–67.5)	81.4%[a,b,c] (80.1–82.7)
1–2 times per week	31.9%[c,d] (29.0–34.8)	30.2%[c,d] (28.4–32.1)	23.7%[a,b,d] (22.3–25.1)	13.6%[a,b,c] (12.5–14.8)
3 or more times per week	10.5%[b,d] (8.6–12.4)	14.9%[a,c,d] (13.4–16.4)	10.4%[b,d] (9.3–11.5)	5.0%[a,b,c] (4.2–5.8)
Past-30-day use of other caffeinated beverages to stay awake				
Never	34.0%[b,c] (31.1–36.9)	24.9%[a,d] (23.2–26.7)	24.0%[a,d] (22.6–25.4)	30.1%[b,c] (28.6–31.5)
1–2 times per week	32.7%[b,c,d] (29.8–35.6)	25.8%[a,c,d] (24.0–27.5)	19.2%[a,b,d] (18.0–20.5)	16.3%[a,b,c] (15.1–17.5)
3 or more times per week	33.3%[b,c,d] (30.5–36.1)	49.3%[a,c,d] (47.3–51.3)	56.8%[a,b,d] (55.2–58.4)	53.6%[a,b,c] (52.1–55.2)
Past-30-day use of OTC medications to stay awake				
Never[z]	97.2% (96.3–98.2)	96.4% (95.6–97.3)	97.0% (96.4–97.5)	97.7% (97.1–98.3)
1–2 times per week[z]	1.9% (1.1–2.7)	2.1% (1.4–2.7)	1.8% (1.3–2.2)	1.2% (0.8–1.5)
3 or more times per week[z]	0.8% (0.3–1.4)	1.5% (1.0–2.0)	1.3% (0.9–1.7)	1.1% (0.6–1.6)
Past-30-day use of prescription medications to stay awake				
Never[z]	97.6% (96.6–98.6)	96.7% (95.9–97.4)	97.2% (96.6–97.7)	97.1% (96.4–97.9)
1–2 times per week[z]	1.0% (0.3–1.7)	0.9% (0.5–1.4)	1.0% (0.6–1.3)	0.8% (0.3–1.3)
3 or more times per week[z]	1.4% (0.7–2.2)	2.4% (1.8–3.0)	1.9% (1.4–2.3)	2.1% (1.5–2.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Chapter Five: Substance Use and Health

Alcohol

Binge Drinking and Heavy Drinking

Table D.23
Alcohol Use in Past 30 Days, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Binge drinking	31.0%[b] (29.7–32.4)	22.1%[a,e] (19.4–24.8)	27.5% (24.6–30.4)	26.5% (22.6–30.4)	33.4%[b] (26.4–40.3)
Heavy drinking[z]	7.6% (6.7–8.4)	6.6% (5.0–8.3)	8.1% (6.2–10.0)	5.2% (3.1–7.2)	10.6% (4.5–16.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.24
Alcohol Use in Past 30 Days, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Binge drinking	31.3%[c,d] (28.5–34.0)	31.2%[c,d] (29.3–33.0)	27.0%[a,b,d] (25.5–28.5)	21.5%[a,b,c] (20.2–22.9)
Heavy drinking[z]	7.9% (6.3–9.6)	7.9% (6.7–9.0)	6.9% (6.0–7.7)	6.0% (5.2–6.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.25
Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any alcohol consequences[z]	4.9% (4.3–5.6)	4.3% (2.9–5.8)	4.4% (3.0–5.8)	3.0% (1.3–4.7)	8.8% (3.8–13.8)
Risky drinking and driving behavior	6.7%[d] (5.9–7.5)	4.6% (3.2–6.0)	5.9%[d] (4.3–7.5)	2.1%[a,c,e] (1.0–3.3)	10.7%[d] (4.7–16.7)
Any productivity loss from drinking	6.1%[d] (5.4–6.9)	4.0% (2.7–5.2)	4.0% (2.7–5.4)	1.8%[a,e] (0.8–2.8)	8.3%[d] (3.7–12.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.26
Serious Consequences, Risk Behaviors, and Productivity Loss from Drinking, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any alcohol consequences	5.5%[d] (4.1–6.9)	5.8%[c,d] (4.9–6.8)	3.8%[b,d] (3.1–4.5)	1.9%[a,b,c] (1.4–2.3)
Risky drinking and driving behavior	6.8%[d] (5.3–8.4)	7.0%[c,d] (5.9–8.1)	5.0%[b] (4.3–5.7)	4.1%[a,b] (3.5–4.7)
Any productivity loss from drinking	5.4%[d] (4.0–6.7)	6.9%[c,d] (5.7–8.0)	4.5%[b,d] (3.9–5.2)	2.5%[a,b,c] (2.0–3.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Military Drinking Culture

Table D.27
Perception of Military Drinking Culture, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Military culture supportive of drinking	22.9%[b,c,d] (21.6–24.2)	15.6%[a] (13.1–18.1)	15.1%[a] (12.6–17.6)	15.7%[a] (12.4–19.0)	16.8% (11.9–21.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

Table D.28
Perception of Military Drinking Culture, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Military culture supportive of drinking	24.0%[c,d] (21.5–26.6)	21.7%[c,d] (20.0–23.3)	17.5%[a,b,d] (16.2–18.8)	12.9%[a,b,c] (11.8–14.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Tobacco

Cigarette, E-Cigarette, Cigar, and Smokeless Tobacco Use

Table D.29
Current Tobacco Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Current cigarette smoking	14.7%[b] (13.5–15.8)	9.5%[a] (7.6–11.5)	11.2% (9.0–13.4)	13.6% (10.5–16.7)	14.0% (8.5–19.5)
Current e-cigarette use[z]	10.3% (9.3–11.4)	7.8% (5.9–9.6)	10.5% (8.3–12.6)	9.9% (7.2–12.6)	10.6% (4.4–16.8)
Current cigar smoking	8.5%[c] (7.6–9.4)	8.8% (6.9–10.7)	5.8%[a] (4.3–7.3)	5.8% (3.7–7.9)	7.5% (3.4–11.7)
Current smokeless tobacco use	14.7%[b,c,d] (13.6–15.9)	3.2%[a,e] (1.7–4.7)	3.8%[a,e] (2.6–4.9)	6.0%[a] (4.0–8.0)	10.9%[b,c] (4.9–16.9)
Current pipe or hookah smoker	2.7%[b] (2.1–3.3)	5.3%[a] (3.7–6.8)	2.7% (1.6–3.8)	2.6% (1.1–4.2)	1.7% (0.01–3.3)
Any current tobacco or nicotine use[1]	34.6%[b,c,d] (33.1–36.1)	23.3%[a] (20.4–26.2)	21.8%[a] (19.1–24.4)	24.7%[a] (20.8–28.6)	27.9% (21.0–34.8)
Any current tobacco or nicotine smoking[2]	26.4%[b,c] (25.0–27.8)	21.3%[a] (18.5–24.0)	20.2%[a] (17.6–22.9)	23.2% (19.3–27.0)	25.4% (18.5–32.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] Includes cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco.

[2] Includes cigarettes, e-cigarettes, cigars, pipes, and hookahs; excludes smokeless tobacco.

Table D.30
Current Tobacco Use, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Current cigarette smoking	13.7%[d] (11.5–15.9)	15.4%[c,d] (13.9–16.9)	12.4%[b,d] (11.2–13.5)	8.4%[a,b,c] (7.4–9.4)
Current e-cigarette use	18.5%[b,c,d] (16.2–20.9)	9.3%[a,c,d] (8.2–10.5)	4.8%[a,b,d] (4.1–5.6)	2.3%[a,b,c] (1.8–2.8)
Current cigar smoking	9.4%[c] (7.6–11.2)	8.3% (7.1–9.6)	6.5%[a] (5.7–7.4)	7.0% (6.0–7.9)
Current smokeless tobacco use	10.8% (8.8–12.7)	12.5%[d] (11.0–13.9)	10.3%[d] (9.3–11.4)	8.2%[b,c] (7.3–9.1)
Current pipe or hookah smoker	4.2%[c,d] (3.0–5.5)	3.8%[c,d] (2.9–4.6)	1.8%[a,b,d] (1.3–2.2)	0.9%[a,b,c] (0.5–1.2)
Any current tobacco or nicotine use[1]	34.4%[c,d] (31.4–37.3)	32.6%[c,d] (30.7–34.6)	27.1%[a,b,d] (25.6–28.6)	22.2%[a,b,c] (20.8–23.6)
Any current tobacco or nicotine smoking[2]	30.5%[c,d] (27.6–33.3)	26.2%[c,d] (24.4–28.0)	20.3%[a,b,d] (19.0–21.7)	15.4%[a,b,c] (14.2–16.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[1] Includes cigarettes, e-cigarettes, cigars, pipes, hookahs, and smokeless tobacco.

[2] Includes cigarettes, e-cigarettes, cigars, pipes, and hookahs; excludes smokeless tobacco.

Smoking Cessation

Table D.31
Past-Year Smoking Cessation Attempts Among Current Smokers, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Attempted to quit smoking[z]	42.8% (38.5–47.2)	54.0% (43.3–64.7)	45.9% (35.5–56.2)	60.5% (48.6–72.4)	NR (30.2–73.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.32
Past-Year Smoking Cessation Attempts Among Current Smokers, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Attempted to quit smoking[z]	46.5% (37.6–55.4)	46.7% (41.4–52.1)	41.8% (36.8–46.7)	45.1% (39.1–51.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Reasons for Use of E-Cigarettes

Table D.33
Reasons for E-Cigarette Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Perceived to be healthier than smoking cigarettes[z]	31.9% (27.3–36.6)	24.7% (15.1–34.3)	29.9% (20.5–39.3)	29.5% (17.5–41.6)	NR (9.5–66.2)
Used to help quit smoking cigarettes	37.1%[c] (32.5–41.8)	25.3% (15.7–34.9)	21.5%[a] (13.7–29.3)	36.0% (23.2–48.7)	NR (2.2–41.4)
Able to use in places where cigarette smoking is not allowed[x]	23.8% (19.8–27.9)	15.5% (8.1–22.9)	24.6% (15.5–33.8)	32.4% (20.3–44.5)	NR (25.8–80.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.34
Reasons for E-Cigarette Use, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Perceived to be healthier than smoking cigarettes[z]	31.4% (25.2–37.6)	29.1% (23.8–34.4)	31.4% (25.2–37.6)	37.5% (27.8–47.3)
Used to help quit smoking cigarettes	22.5%[b,c,d] (17.1–27.9)	42.7%[a] (36.9–48.6)	45.7%[a] (39.0–52.3)	48.4%[a] (38.4–58.3)
Able to use in places where cigarette smoking is not allowed[z]	21.5% (16.3–26.7)	27.5% (22.3–32.8)	22.9% (17.1–28.7)	28.4% (19.8–36.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Drug Use and Prescription Drug Use and Misuse

Past-Year Drug Use

Table D.35
Past Year Drug Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any drug use[z]	2.7% (2.1–3.3)	3.5% (1.9–5.2)	2.4% (1.2–3.6)	0.5% (0.0–1.0)	4.5% (0.2–8.9)
Any use of nonprescription cough or cold medicine to get high[z]	0.4% (0.2–0.6)	0.4% (0.2–0.7)	0.5% (0.1–0.9)	0.2% (0.0–0.5)	0.7% (0.0–1.9)
Any marijuana or synthetic cannabis use[z]	2.4% (1.8–3.0)	3.4% (1.8–5.0)	2.3% (1.2–3.5)	0.4% (0.0–0.8)	3.3% (0.0–7.4)
Any drug use excluding marijuana	0.8% (0.4–1.2)	0.2%[e] (0.0–0.5)	0.3%[e] (0.0–0.6)	0.2%[e] (0.0–0.5)	3.3%[b,c,d] (0.0–7.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.36
Past-Year Drug Use, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any drug use	4.1%[c,d] (2.8–5.4)	3.5%[c,d] (2.6–4.5)	1.0%[a,b,d] (0.7–1.4)	0.4%[a,b,c] (0.2–0.6)
Any use of nonprescription cough or cold medicine to get high[z]	0.3% (0.0–0.6)	0.4% (0.1–0.7)	0.4% (0.1–0.6)	0.7% (0.5–1.0)
Any marijuana or synthetic cannabis use	3.8%[c,d] (2.5–5.0)	3.2%[c,d] (2.3–4.2)	1.0%[a,b,d] (0.6–1.3)	0.3%[a,b,c] (0.1–0.5)
Any drug use excluding marijuana	0.8%[c,d] (0.3–1.4)	1.0%[c,d] (0.4–1.7)	0.2%[a,b] (0.1–0.4)	0.1%[a,b] (0.0–0.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.37
Past-30-Day Drug Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any past-30-day drug use[z]	1.3% (0.9–1.8)	1.9% (0.7–3.2)	1.3% (0.4–2.2)	0.2% (0.0–0.5)	3.6% (0.0–7.9)
Any past-30-day marijuana or synthetic cannabis use[z]	1.2% (0.8–1.7)	1.9% (0.7–3.2)	1.2% (0.3–2.1)	0.1% (0.0–0.3)	2.9% (0.0–7.0)
Any past-30-day drug use excluding marijuana and synthetic cannabis	0.3% (0.1–0.4)	0.02%[e] (0.0–0.05)	0.2% (0.0–0.4)	0.1% (0.0–0.3)	0.8%[b] (0.0–1.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[b] Statistically significantly different from non-Hispanic black estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.38
Past-30-Day Drug Use, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any past-30-day drug use	2.6%[c,d] (1.5–3.6)	1.6%[c,d] (1.0–2.2)	0.6%[a,b] (0.3–0.8)	0.2%[a,b] (0.1–0.4)
Any past-30-day marijuana or synthetic cannabis use	2.4%[c,d] (1.4–3.5)	1.4%[c,d] (0.9–2.0)	0.5%[a,b] (0.2–0.7)	0.2%[a,b] (0.05–0.3)
Any past-30-day drug use excluding marijuana and synthetic cannabis[z]	0.2% (0.0005–0.4)	0.3% (0.1–0.4)	0.2% (0.1–0.4)	0.05% (0.0–0.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Prescription Drug Use

Table D.39
Past-Year Prescription Drug Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any prescription drug use	12.6%[d] (11.7–13.5)	12.4%[d] (10.6–14.2)	10.8%[d] (9.1–12.6)	6.7%[a,b,c,e] (4.6–8.7)	14.8%[d] (10.1–19.5)
Prescription stimulants	3.1%[c,d] (2.5–3.7)	1.6% (0.9–2.3)	1.6%[a] (1.0–2.3)	1.0%[a] (0.3–1.7)	2.7% (0.4–5.0)
Prescription sedatives	4.7%[d] (4.2–5.3)	5.1%[d] (3.9–6.2)	3.9% (3.0–4.8)	1.9%[a,b] (0.8–3.0)	3.7% (1.9–5.6)
Prescription pain relievers	8.2% (7.5–8.9)	9.7%[d] (8.0–11.4)	8.0% (6.4–9.5)	5.4%[b] (3.5–7.3)	10.0% (6.0–14.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

Table D.40
Past-Year Prescription Drug Use, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any prescription drug use	6.9%[b,c,d] (5.5–8.4)	12.4%[a,c,d] (11.1–13.7)	14.9%[a,b] (13.8–16.0)	16.9%[a,b] (15.7–18.2)
Prescription stimulants[x]	1.8% (0.9–2.6)	3.2% (2.3–4.0)	2.9% (2.4–3.4)	2.2% (1.5–2.9)
Prescription sedatives	1.7%[b,c,d] (1.0–2.4)	4.2%[a,c,d] (3.5–5.0)	6.7%[a,b] (5.9–7.5)	7.5%[a,b] (6.7–8.2)
Prescription pain relievers	5.2%[b,c,d] (3.9–6.5)	8.1%[a,d] (7.1–9.2)	10.0%[a,d] (9.0–10.9)	12.3%[a,b,c] (11.3–13.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Prescription Drug Misuse

Table D.41
Past-Year Prescription Drug Misuse, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any prescription drug misuse[z]	1.9% (1.4–2.5)	1.6% (0.7–2.4)	1.4% (0.9–2.0)	0.7% (0.1–1.3)	1.1% (0.0–2.5)
Prescription stimulant misuse	0.8%[b] (0.4–1.3)	0.1%[a] (0.0–0.2)	0.3% (0.1–0.6)	0.2% (0.0–0.5)	0.3% (0.0–0.7)
Prescription sedative misuse[z]	0.6% (0.4–0.9)	0.6% (0.2–1.1)	0.7% (0.3–1.0)	0.5% (0.0–1.1)	0.2% (0.0–0.6)
Prescription pain reliever misuse[z]	1.1% (0.7–1.4)	1.2% (0.4–2.0)	0.9% (0.4–1.4)	0.2% (0.0–0.5)	0.9% (0.0–2.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.42
Past-Year Prescription Drug Misuse, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any prescription drug misuse[z]	2.3% (1.3–3.3)	1.6% (0.9–2.3)	1.3% (0.9–1.7)	1.5% (1.1–1.8)
Prescription stimulant misuse[z]	0.9% (0.2–1.6)	0.7% (0.1–1.2)	0.4% (0.2–0.6)	0.2% (0.05–0.3)
Prescription sedative misuse[z]	0.8% (0.2–1.3)	0.5% (0.2–0.7)	0.6% (0.4–0.9)	0.7% (0.4–0.9)
Prescription pain reliever misuse	1.7%[c] (0.8–2.5)	0.8% (0.4–1.1)	0.7%[a] (0.4–1.0)	0.9% (0.6–1.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Chapter Six: Mental and Emotional Health

Mental Health Status

Serious Psychological Distress

Table D.43
Serious Psychological Distress, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Past-month serious psychological distress[z]	6.5% (5.5–7.4)	6.6% (5.0–8.1)	7.1% (5.4–8.7)	5.9% (3.7–8.0)	4.6% (2.2–7.0)
Past-year serious psychological distress[z]	10.5% (9.5–11.6)	11.4% (9.3–13.4)	11.7% (9.6–13.7)	10.1% (7.3–12.9)	9.6% (6.1–13.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.44
Serious Psychological Distress, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Past-month serious psychological distress (K6 score ≥13)	7.9%[d] (6.0–9.7)	7.0%[d] (5.9–8.0)	5.6%[d] (4.8–6.4)	3.7%[a,b,c] (3.1–4.3)
Past-year serious psychological distress (K6 score ≥13)	12.7%[c,d] (10.5–14.9)	11.9%[c,d] (10.6–13.2)	8.9%[a,b,d] (7.9–9.9)	6.5%[a,b,c] (5.6–7.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Probable PTSD

Table D.45
Probable PTSD, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Probable PTSD (PC-PTSD-5 score ≥3)	10.9%[d] (10.1–11.8)	10.6%[d] (8.9–12.4)	9.5%[d] (7.9–11.2)	5.9%[a,b,c,e] (4.2–7.7)	11.9%[d] (8.0–15.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

Table D.46
Probable PTSD, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Probable PTSD (PC-PTSD-5 score ≥3)	5.5%[b,c,d] (4.2–6.8)	10.9%[a,c,d] (9.7–12.2)	14.1%[a,b] (12.9–15.3)	13.3%[a,b] (12.2–14.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Angry and Aggressive Behavior

Table D.47
Angry and Aggressive Behaviors, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any angry/aggressive behavior in past 30 days[z]	47.1% (45.6–48.5)	48.0% (44.8–51.2)	46.3% (43.1–49.6)	42.4% (37.8–47.1)	46.9% (40.1–53.7)
Angry/aggressive behavior 5+ times in past 30 days[x]	5.8% (5.1–6.6)	8.1% (6.3–10.0)	5.8% (4.4–7.2)	6.0% (4.1–7.8)	4.5% (2.3–6.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.48
Angry and Aggressive Behaviors, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any angry/aggressive behavior in past 30 days	45.5%[c] (42.4–48.5)	46.4%[c] (44.4–48.4)	50.6%[a,b,d] (49.0–52.3)	44.8%[c] (43.2–46.3)
Angry/aggressive behavior 5+ times in past 30 days	6.1% (4.6–7.6)	5.5%[c] (4.5–6.5)	7.8%[b,d] (6.8–8.8)	5.4%[c] (4.7–6.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Unwanted Sexual Contact

Table D.49
Unwanted Sexual Contact, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Unwanted sexual contact since joining the military	7.7% (7.0–8.4)	8.1% (6.6–9.6)	8.1% (6.7–9.6)	5.4%[e] (3.8–7.0)	11.6%[d] (8.3–14.9)
Unwanted sexual contact in the past 12 months[z]	1.5% (1.1–2.0)	1.8% (0.9–2.7)	1.4% (0.8–2.0)	1.3% (0.4–2.2)	2.6% (0.8–4.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. The exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.50
Unwanted Sexual Contact, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Unwanted sexual contact since joining the military	6.3%[b,c] (4.9–7.6)	8.8%[a,d] (7.9–9.8)	8.5%[a,d] (7.7–9.3)	6.9%[b,c] (6.2–7.7)
Unwanted sexual contact in the past 12 months	2.7%[c,d] (1.7–3.7)	1.7%[c,d] (1.2–2.2)	0.8%[a,b,d] (0.5–1.1)	0.3%[a,b,c] (0.1–0.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses. The exact question wording in the 2018 HRBS is "The next question is about unwanted sexual contact, meaning times when someone has touched you in a sexual way, had sex with you, or attempted to have sex with you when you did not consent or could not consent. By sexual contact we mean any sexual touching as well as oral, anal or vaginal penetration. Since joining the military, have you ever experienced unwanted sexual contact?" and "Did this unwanted sexual contact occur in the past 12 months?"

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Physical Assault

Table D.51
Physical Assault, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Physically assaulted since joining the military[x]	3.8% (3.3–4.3)	4.1% (2.9–5.4)	3.2% (2.2–4.1)	2.9% (1.7–4.1)	7.9% (3.4–12.4)
Physically assaulted in the past 12 months	0.5%[e] (0.3–0.7)	1.3% (0.5–2.1)	0.5%[e] (0.1–0.8)	0.4%[e] (0.0–0.9)	4.0%[a,c,d] (0.0–8.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Table D.52
Physical Assault, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Physically assaulted since joining the military	2.3%[b,c,d] (1.3–3.2)	4.3%[a] (3.5–5.0)	4.5%[a] (3.9–5.2)	4.5%[a] (3.8–5.3)
Physically assaulted in the past 12 months[z]	0.9% (0.3–1.5)	0.7% (0.4–1.1)	0.4% (0.2–0.6)	0.5% (0.3–0.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Suicide

Table D.53
Suicide, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Suicidal ideation, past 12 months[z]	6.0% (5.2–6.7)	7.0% (5.2–8.8)	5.4% (4.0–6.9)	3.9% (2.1–5.8)	6.9% (3.7–10.2)
Suicide plan, past 12 months[z]	2.0% (1.5–2.5)	2.2% (1.1–3.2)	2.0% (1.1–2.9)	1.7% (0.3–3.1)	1.2% (0.02–2.4)
Suicide attempt, past 12 months[z]	0.9% (0.5–1.3)	1.0% (0.2–1.8)	1.1% (0.4–1.7)	1.2% (0.0–2.4)	0.0% (0.0–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.54
Suicide, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Suicidal ideation, past 12 months	6.6%[d] (5.0–8.2)	6.9%[c,d] (5.9–8.0)	4.7%[b] (4.0–5.5)	4.1%[a,b] (3.4–4.9)
Suicide plan, past 12 months[z]	2.0% (1.0–3.1)	2.4% (1.8–3.1)	1.6% (1.1–2.0)	1.5% (0.9–2.1)
Suicide attempt, past 12 months[z]	1.3% (0.3–2.2)	1.1% (0.6–1.5)	0.6% (0.3–0.9)	0.5% (0.3–0.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Problematic Gambling

Table D.55
Past-Year Gambling Problem, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Past-year gambling problem	1.3%[c] (0.9–1.8)	2.1% (1.0–3.2)	3.1%[a] (1.9–4.4)	2.6% (1.2–4.1)	1.0% (0.1–1.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

Table D.56
Past-Year Gambling Problem, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Past-year gambling problem	2.6%[d] (1.5–3.8)	1.5% (1.0–2.0)	1.5% (1.1–1.9)	1.0%[a] (0.7–1.3)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Mental Health Services

Past-Year Mental Health Service Utilization

Table D.57
Past-Year Mental Health Service Utilization, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any mental health service use in the past year	20.0% (18.9–21.1)	23.7%[d] (21.1–26.3)	23.8%[d] (21.0–26.6)	16.4%[b,c,e] (13.4–19.3)	25.8%[d] (19.6–32.1)
Saw mental health provider in the past year	13.2%[d] (12.3–14.2)	15.2%[d] (13.1–17.3)	13.6%[d] (11.6–15.6)	9.0%[a,b,c,e] (6.8–11.2)	17.6%[d] (12.6–22.6)
Saw general medical provider in the past year	11.8% (11.0–12.7)	14.9%[d] (12.7–17.0)	14.8%[d] (12.4–17.2)	9.1%[b,c] (6.9–11.2)	16.3% (10.7–21.8)
Any mental health services from specialty mental health or medical provider	17.8%[d] (16.8–18.9)	21.4%[d] (18.9–23.8)	21.0%[d] (18.3–23.7)	12.9%[a,b,c,e] (10.3–15.4)	25.1%[d] (18.8–31.3)
Saw clergy, chaplain, or pastor in the past year[z]	5.9% (5.3–6.6)	7.6% (6.0–9.2)	6.5% (5.0–8.0)	6.5% (4.3–8.6)	4.9% (2.8–7.0)
Only saw clergy (no medical) in the past year[z]	2.1% (1.7–2.5)	2.3% (1.3–3.3)	2.8% (1.7–3.9)	3.5% (1.9–5.1)	0.8% (0.1–1.4)
Mental health services at a military facility (excluding clergy)	4.9%[b,e] (4.3–5.4)	8.4%[a,d] (6.8–10.1)	6.3% (5.1–7.6)	4.8%[b] (3.4–6.2)	9.0%[a] (5.4–12.7)
Mental health services at a VA facility (excluding clergy)	5.0%[d] (4.4–5.7)	6.6%[d] (5.2–8.0)	6.2%[d] (4.9–7.6)	2.7%[a,b,c,e] (1.6–3.7)	6.7%[d] (3.2–10.3)
Mental health services at a civilian facility (excluding clergy)	10.7%[d] (9.8–11.5)	10.5%[d] (8.6–12.3)	9.2% (7.4–10.9)	5.7%[a,b,e] (3.9–7.5)	13.1%[d] (8.7–17.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.58
Past-Year Mental Health Service Utilization, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any mental health service use in the past year	15.9%[b,c,d] (13.7–18.1)	21.6%[a,c] (20.0–23.2)	24.6%[a,b] (23.2–26.0)	23.7%[a] (22.3–25.1)
Saw mental health provider in the past year	8.4%[b,c,d] (6.9–10.0)	14.4%[a] (13.1–15.8)	16.6%[a] (15.4–17.9)	16.0%[a] (14.7–17.2)
Saw general medical provider in the past year	9.1%[b,c,d] (7.4–10.9)	13.0%[a] (11.7–14.3)	15.1%[a] (13.9–16.2)	14.8%[a] (13.7–15.9)
Any mental health services from specialty mental health or medical provider	13.4%[b,c,d] (11.4–15.4)	19.5%[a] (18.0–21.1)	22.1%[a] (20.8–23.5)	21.6%[a] (20.2–22.9)
Saw clergy, chaplain, or pastor in the past year	4.9%[c,d] (3.6–6.1)	6.4% (5.4–7.4)	7.2%[a] (6.4–8.0)	7.2%[a] (6.4–8.0)
Only saw clergy (no medical) in the past year[z]	2.5% (1.5–3.4)	2.1% (1.6–2.6)	2.4% (1.9–2.9)	2.2% (1.7–2.6)
Mental health services at a military facility (excluding clergy)	4.3%[c,d] (3.2–5.4)	5.8% (4.9–6.7)	6.7%[a] (5.9–7.4)	6.7%[a] (6.0–7.5)
Mental health services at a VA facility (excluding clergy)	1.0%[b,c,d] (0.4–1.7)	6.2%[a] (5.2–7.3)	7.7%[a] (6.7–8.7)	7.8%[a] (6.9–8.7)
Mental health services at a civilian facility (excluding clergy)	7.9%[b,c,d] (6.4–9.4)	11.1%[a] (9.9–12.3)	11.3%[a] (10.3–12.3)	11.0%[a] (9.9–12.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Past-Year Mental Health Medication Use

Table D.59
Past-Year Mental Health Medication Use, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Use of medications for a mental health problem	8.7%[d] (8.0–9.5)	8.2%[d] (6.7–9.8)	7.3%[d] (5.8–8.8)	3.7%[a,b,c,e] (2.5–4.9)	7.9%[d] (4.6–11.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

Table D.60
Past-Year Mental Health Medication Use, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Use of medications for a mental health problem	4.2%[b,c,d] (3.0–5.4)	8.6%[a,d] (7.5–9.8)	10.6%[a] (9.6–11.7)	10.9%[a,b] (9.9–11.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Past-Year Average Number of Mental Health Visits

Table D.61
Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Race/ Ethnicity

	Non-Hispanic White n = 2,189	Non-Hispanic Black n = 526	Hispanic n = 432	Non-Hispanic Asian n = 157	Other n = 91
Mean number of mental health visits[z]	9.3 (8.5–10.1)	11.2 (8.5–14.0)	9.9 (7.9–11.9)	9.4 (6.4–12.3)	9.7 (6.3–13.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.62
Average Number of Mental Health Visits in the Past Year for Those Who Used Services, by Age

	Ages 17–24 n = 255	Ages 25–34 n = 866	Ages 35–44 n = 1,164	Ages 45+ n = 1,118
Mean number of mental health visits	6.9[b,c,d] (5.4–8.4)	10.4[a] (9.0–11.8)	10.9[a] (9.5–12.3)	9.7[a] (8.6–10.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Perceived Unmet Need for Mental Health Services

Table D.63
Perceived Unmet Need for Mental Health Services, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Perceived unmet need for mental health services[z]	4.7% (4.1–5.4)	5.0% (3.7–6.3)	4.3% (3.1–5.5)	2.7% (1.5–4.0)	2.5% (0.9–4.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.64
Perceived Unmet Need for Mental Health Services, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Perceived unmet need for mental health services[x]	3.4% (2.4–4.4)	5.3% (4.4–6.2)	4.7% (4.0–5.5)	4.4% (3.7–5.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Concern that Mental Health Treatment Would Damage a Military Career

Table D.65
Perception That Seeking Mental Health Treatment Would Damage Military Career, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Seeking mental health treatment would damage military career	32.2%[b,c,d] (30.9–33.6)	25.1%[a] (22.4–27.8)	27.1%[a,d] (24.4–29.8)	20.8%[a,c,e] (17.5–24.1)	33.0%[d] (26.4–39.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

Table D.66
Perception That Seeking Mental Health Treatment Would Damage Military Career, by Age

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Seeking mental health treatment would damage military career	24.2%[b,c,d] (21.6–26.8)	30.7%[a,c] (28.8–32.5)	34.3%[a,b] (32.7–35.8)	32.0%[a] (30.5–33.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Chapter Seven: Physical Health and Functioning

Chronic Conditions

Table D.67
Past-Year Physician-Diagnosed Chronic Conditions, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
High blood pressure	8.9%[b] (8.2–9.6)	12.1%[a,c,d] (10.3–14.0)	8.3%[b] (6.6–9.9)	6.8%[b] (4.9–8.7)	11.4% (7.8–15.0)
Diabetes	0.9%[c] (0.7–1.2)	1.6% (1.0–2.1)	2.0%[a,e] (1.2–2.7)	1.6% (0.5–2.8)	0.4%[c] (0.0–0.8)
High cholesterol[z]	6.9% (6.4–7.4)	6.3% (5.1–7.5)	7.0% (5.6–8.4)	7.1% (5.5–8.7)	5.5% (3.4–7.7)
Asthma	1.7%[b] (1.3–2.0)	3.0%[a] (2.1–4.0)	2.3% (1.3–3.4)	1.3% (0.5–2.2)	2.7% (1.1–4.3)
Angina or coronary heart disease[z]	0.3% (0.1–0.4)	0.5% (0.02–1.0)	0.3% (0.1–0.5)	0.2% (0.01–0.4)	0.2% (0.0–0.5)
Heart attack[z]	0.2% (0.1–0.4)	0.05% (0.0–0.1)	0.2% (0.02–0.5)	0.1% (0.0–0.2)	0.0% (0.0–1.4)
Back pain	22.5%[d] (21.3–23.7)	20.1% (17.8–22.3)	21.6%[d] (19.2–24.0)	15.4%[a,c] (12.6–18.1)	22.5% (17.1–27.8)
Bone, joint, or muscle injury (including arthritis)	22.6%[d] (21.5–23.8)	22.4%[d] (20.2–24.7)	19.9% (17.6–22.2)	15.7%[a,b] (13.1–18.4)	23.4% (18.0–28.8)
Number of medical diagnoses in past year					
No conditions	62.9%[d] (61.5–64.3)	62.5%[d] (59.6–65.5)	64.2%[d] (61.3–67.2)	71.8%[a,b,c,e] (68.1–75.4)	60.6%[d] (54.2–66.9)
1–2 conditions	31.4%[d] (30.1–32.7)	31.2%[d] (28.4–33.9)	29.6% (26.8–32.3)	24.3%[a,b,e] (20.8–27.7)	33.9%[d] (27.8–40.0)
3+ conditions[z]	5.7% (5.2–6.2)	6.3% (5.2–7.4)	6.2% (4.8–7.6)	4.0% (2.8–5.1)	5.5% (3.2–7.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.68
Past-Year Physician-Diagnosed Chronic Conditions, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
High blood pressure	3.3%[b,c,d] (2.1–4.4)	7.0%[a,c,d] (6.0–8.1)	12.0%[a,b,d] (10.9–13.1)	23.2%[a,b,c] (21.8–24.5)
Diabetes	0.5%[d] (0.1–1.0)	0.4%[c,d] (0.1–0.7)	1.6%[b,d] (1.1–2.0)	4.1%[a,b,c] (3.5–4.7)
High cholesterol	0.9%[b,c,d] (0.2–1.5)	3.6%[a,c,d] (2.9–4.3)	10.0%[a,b,d] (9.0–11.0)	22.3%[a,b,c] (20.9–23.6)
Asthma	1.4% (0.6–2.2)	1.7%[d] (1.2–2.2)	2.5% (2.0–3.0)	2.9%[b] (2.4–3.4)
Angina or coronary heart disease	0.3% (0.0–0.6)	0.1%[d] (0.0–0.1)	0.2%[d] (0.1–0.4)	1.2%[b,c] (0.9–1.6)
Heart attack	0.2% (0.0–0.4)	0.1%[d] (0.0–0.2)	0.1%[d] (0.02–0.2)	0.6%[b,c] (0.4–0.8)
Back pain	10.2%[b,c,d] (8.5–12.0)	21.2%[a,c,d] (19.5–22.9)	29.9%[a,b] (28.4–31.4)	32.3%[a,b] (30.8–33.7)
Bone, joint, or muscle injury (including arthritis)	9.2%[b,c,d] (7.5–10.9)	19.8%[a,c,d] (18.2–21.4)	30.6%[a,b,d] (29.1–32.1)	39.2%[a,b,c] (37.6–40.7)
Number of medical diagnoses in past year				
No conditions	82.1%[b,c,d] (79.8–84.4)	66.4%[a,c,d] (64.5–68.3)	51.1%[a,b,d] (49.5–52.7)	37.7%[a,b,c] (36.2–39.2)
1–2 conditions	16.6%[b,c,d] (14.4–18.9)	30.3%[a,c,d] (28.5–32.1)	40.3%[a,b,d] (38.7–41.9)	45.2%[a,b,c] (43.6–46.8)
3+ conditions	1.3%[b,c,d] (0.6–2.0)	3.3%[a,c,d] (2.6–4.0)	8.6%[a,b,d] (7.6–9.6)	17.1%[a,b,c] (15.9–18.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Physical Symptoms

Table D.69
Bothered a Lot by Physical Symptoms in the Past 30 Days, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Stomach or bowel problems[z]	4.9% (4.3–5.5)	6.0% (4.6–7.5)	6.0% (4.7–7.3)	3.5% (2.3–4.7)	6.5% (3.3–9.8)
Back pain[z]	12.8% (11.9–13.7)	14.3% (12.4–16.3)	13.2% (11.3–15.1)	10.1% (7.6–12.6)	13.4% (8.6–18.1)
Pain in the arms, legs, or joints	11.0%[b,d] (10.2–11.9)	15.6%[a,d] (13.5–17.6)	12.0%[d] (10.2–13.9)	7.2%[a,b,c] (5.4–8.9)	10.9% (6.9–14.8)
Headaches	5.7%[b,c] (5.0–6.4)	9.2%[a,d] (7.6–10.9)	7.9%[a] (6.4–9.4)	4.7%[b] (3.1–6.3)	7.8% (4.5–11.1)
Chest pain or shortness of breath[z]	1.8% (1.4–2.1)	2.6% (1.6–3.7)	2.6% (1.5–3.8)	1.6% (0.8–2.5)	0.9% (0.03–1.8)
Dizziness[z]	1.8% (1.4–2.2)	2.7% (1.7–3.6)	2.3% (1.4–3.2)	1.8% (0.9–2.6)	1.9% (0.6–3.3)
Feeling tired or having low energy	11.7% (10.7–12.6)	12.9%[d] (11.1–14.8)	13.3%[d] (11.2–15.4)	8.1%[b,c] (5.8–10.3)	13.7% (9.3–18.1)
Trouble sleeping	12.8%[b,d] (11.8–13.8)	17.6%[a,d] (15.4–19.9)	15.4%[d] (13.2–17.5)	8.9%[a,b,c] (6.7–11.1)	13.0% (8.7–17.3)
Any bodily pain (back, arms, legs, or joints)	18.1%[b,d] (17.0–19.1)	22.2%[a,d] (19.8–24.6)	19.0%[d] (16.8–21.3)	13.1% [a,b,c,d] (10.4–15.8)	17.8% (12.8–22.8)
Any bodily pain including headache	20.5%[b,d] (19.3–21.6)	25.3%[a,d] (22.8–27.8)	21.4%[d] (19.0–23.8)	15.2%[a,b,c] (12.3–18.1)	21.9% (16.4–27.3)
High physical symptom severity	10.1%[b] (9.3–11.0)	13.1%[a] (11.2–14.9)	12.8% (10.8–14.8)	9.9% (7.7–12.1)	12.9% (8.4–17.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.70
Bothered a Lot by Physical Symptoms in the Past 30 Days, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Stomach or bowel problems	3.6%[c,d] (2.6–4.7)	5.3% (4.4–6.1)	6.7%[a] (5.8–7.5)	5.7%[a] (5.0–6.4)
Back pain	7.2%[b,c,d] (5.8–8.7)	12.5%[a,c,d] (11.2–13.9)	18.0%[a,b] (16.6–19.3)	17.4%[a,b] (16.3–18.6)
Pain in the arms, legs, or joints	5.8%[b,c,d] (4.4–7.2)	10.7%[a,c,d] (9.4–11.9)	16.1%[a,b,d] (14.8–17.3)	19.1%[a,b,c] (17.8–20.3)
Headaches	4.5%[b,c,d] (3.2–5.8)	7.2%[a] (6.2–8.2)	7.7%[a] (6.8–8.6)	7.1%[a] (6.3–7.9)
Chest pain or shortness of breath[z]	1.6% (0.9–2.4)	2.0% (1.5–2.5)	2.4% (1.8–2.9)	2.1% (1.7–2.6)
Dizziness[z]	1.6% (0.9–2.3)	2.1% (1.5–2.6)	2.1% (1.6–2.6)	2.4% (1.9–2.8)
Feeling tired or having low energy	8.8%[b,c,d] (7.1–10.5)	12.8%[a] (11.4–14.1)	14.3%[a] (13.1–15.5)	12.3%[a] (11.3–13.3)
Trouble sleeping	10.5%[c,d] (8.6–12.5)	13.4%[c,d] (12.0–14.8)	16.3%[a,b] (15.0–17.5)	16.4%[a,b] (15.2–17.5)
Any bodily pain (back, arms, legs, or joints)	10.2%[b,c,d] (8.5–12.0)	17.8%[a,c,d] (16.2–19.3)	25.1%[a,b] (23.7–26.6)	26.9%[a,b] (25.5–28.3)
Any bodily pain including headache	12.6%[b,c,d] (10.7–14.6)	20.8%[a,c,d] (19.2–22.4)	27.4%[a,b] (25.9–28.9)	28.7%[a,b] (27.3–30.1)
High physical symptom severity	6.6%[b,c,d] (5.2–8.0)	11.5%[a,c,d] (10.2–12.8)	13.8%[a,b] (12.6–15.0)	13.9%[a,b] (12.8–15.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Traumatic Brain Injury and Postconcussive Symptoms

Table D.71
Past-Year Injury, TBI, and Postconcussive Symptoms, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any injury[z]	20.5% (19.3–21.7)	23.0% (20.3–25.7)	22.3% (19.8–24.9)	19.6% (16.1–23.0)	25.7% (19.3–32.1)
Positive screen for mild TBI[z]	4.3% (3.7–4.9)	4.7% (3.4–6.1)	4.3% (3.1–5.4)	3.2% (1.9–4.6)	4.3% (1.7–6.8)
Positive screen for moderate to severe TBI[z]	0.2% (0.01–0.3)	0.1% (0.0–0.2)	0.1% (0.01–0.3)	0.5% (0.0–1.1)	0.2% (0.0–0.4)
Postconcussive symptoms[z]	2.5% (2.0–3.0)	3.1% (2.1–4.1)	3.2% (2.2–4.1)	2.7% (1.4–3.9)	2.5% (0.7–4.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.72
Past-Year Injury, TBI, and Postconcussive Symptoms, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any injury	19.9%[d] (17.4–22.3)	20.5%[d] (18.9–22.1)	22.3% (21.0–23.7)	23.8%[a,b] (22.4–25.1)
Positive screen for mild TBI[z]	4.5% (3.3–5.7)	4.3% (3.5–5.2)	4.1% (3.4–4.8)	4.2% (3.6–4.9)
Positive screen for moderate to severe TBI[x]	0.3% (0.02–0.7)	0.1% (0.0–0.1)	0.1% (0.01–0.2)	0.1% (0.02–0.2)
Postconcussive symptoms[z]	2.2% (1.4–3.1)	3.0% (2.2–3.7)	2.7% (2.1–3.2)	3.0% (2.4–3.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Self-Rated Health

Table D.73
Self-Rated Overall Physical Health, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Excellent[z]	17.2% (16.0–18.3)	17.2% (14.7–19.8)	15.4% (13.2–17.7)	18.4% (15.0–21.8)	15.5% (10.8–20.1)
Very good	42.2%[b] (40.7–43.6)	34.6%[a] (31.7–37.6)	39.5% (36.3–42.7)	38.7% (34.3–43.0)	37.9% (31.5–44.3)
Good[z]	32.5% (31.1–33.8)	36.2% (33.0–39.3)	33.3% (30.3–36.3)	35.2% (30.5–39.8)	38.6% (31.7–45.5)
Fair	7.2%[b,c] (6.4–8.0)	10.5%[a] (8.5–12.6)	10.4%[a] (8.3–12.5)	6.8% (4.8–8.8)	7.4% (4.2–10.7)
Poor[z]	1.0% (0.7–1.3)	1.4% (0.8–2.1)	1.4% (0.8–2.1)	0.9% (0.0–2.0)	0.7% (0.0–1.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.74
Self-Rated Overall Physical Health, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Excellent	22.0%[b,c,d] (19.5–24.4)	16.9%[a,c,d] (15.5–18.4)	13.5%[a,b] (12.5–14.6)	12.7%[a,b] (11.7–13.7)
Very good[z]	39.6% (36.6–42.5)	39.6% (37.7–41.5)	42.0% (40.4–43.6)	41.3% (39.8–42.8)
Good	30.2%[c,d] (27.4–33.1)	33.9% (32.0–35.8)	34.9%[a] (33.3–36.5)	36.1%[a] (34.6–37.6)
Fair[z]	7.3% (5.7–9.0)	8.5% (7.3–9.6)	8.2% (7.2–9.1)	8.6% (7.8–9.5)
Poor[z]	0.9% (0.4–1.5)	1.1% (0.7–1.5)	1.4% (0.9–1.8)	1.2% (0.9–1.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Health-Related Physical Limitations

Table D.75
Health-Related Functional Limitations: Absenteeism and Presenteeism, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Absenteeism (average number of days lost due to mental or physical symptoms, past 30 days)	0.41[b,c] (0.35–0.47)	0.84[a,d] (0.60–1.09)	0.78[a,d] (0.58–0.98)	0.42[b,c] (0.27–0.57)	0.64 (0.34–0.93)
Presenteeism (average number of days productivity impaired by mental or physical symptoms, past 30 days)	1.50[d] (1.36–1.64)	1.60 (1.28–1.92)	1.48 (1.16–1.81)	1.05[a] (0.77–1.34)	1.95 (1.27–2.63)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

Table D.76
Health-Related Functional Limitations: Absenteeism and Presenteeism, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Absenteeism (average number of days lost due to mental or physical symptoms, past 30 days)	0.31[b,c,d] (0.22–0.39)	0.61[a] (0.48–0.74)	0.62[a] (0.51–0.73)	0.62[a] (0.52–0.72)
Presenteeism (average number of days productivity impaired by mental or physical symptoms, past 30 days)	1.15[b,c] (0.92–1.39)	1.65[a] (1.44–1.86)	1.66[a] (1.47–1.85)	1.51 (1.34–1.67)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Chapter Eight: Sexual Behavior and Health

Table D.77
Past-Year Sexual Risk Behaviors and Outcomes, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
2+ sex partners in past 12 months	15.0%[b] (13.8–16.2)	21.1%[a,c,d] (18.4–23.9)	15.3%[b] (12.9–17.7)	10.5%[b] (7.7–13.3)	18.5% (12.2–24.9)
Sex with a new partner without a condom in past year	32.7% (31.3–34.2)	32.4% (29.4–35.4)	36.2% (33.1–39.4)	29.4%[e] (25.5–33.3)	40.7%[d] (33.8–47.7)
Condom use during most-recent vaginal sex	22.2%[b] (20.8–23.5)	26.6%[a] (23.6–29.6)	25.0% (22.1–27.9)	24.7% (20.1–29.3)	29.6% (22.8–36.5)
STI in past year[x]	1.7% (1.4–2.1)	2.7% (1.8–3.6)	1.5% (0.9–2.1)	1.3% (0.3–2.3)	2.7% (0.9–4.5)
High risk[1] for HIV	16.7%[b] (15.5–18.0)	23.1%[a,c,d] (20.3–25.9)	17.3%[b] (14.8–19.9)	12.4%[b] (9.4–15.4)	20.7% (14.3–27.1)
Unintended pregnancy in the past year	2.1%[b,d] (1.6–2.6)	4.2%[a,d] (2.8–5.6)	2.8%[d] (1.8–3.8)	0.5%[a,b,c,e] (0.1–0.9)	3.4%[d] (1.2–5.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table D.78
Past-Year Sexual Risk Behaviors and Outcomes, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
2+ sex partners in past 12 months	24.5%[b,c,d] (21.8–27.2)	16.9%[a,c,d] (15.4–18.3)	9.7%[a,b,d] (8.8–10.7)	5.7%[a,b,c] (4.9–6.5)
Sex with a new partner without a condom in past year[z]	32.0% (29.1–34.9)	34.2% (32.3–36.1)	33.8% (32.3–35.4)	31.4% (29.9–32.9)
Condom use during most-recent vaginal sex	37.4%[b,c,d] (34.4–40.3)	24.2%[a,c,d] (22.5–25.9)	14.6%[a,b,d] (13.4–15.7)	8.6%[a,b,c] (7.7–9.5)
STI in past year	2.0% (1.3–2.6)	2.3%[c,d] (1.8–2.8)	1.4%[b] (1.1–1.8)	1.1%[b] (0.8–1.5)
High risk[1] for HIV	26.1%[b,c,d] (23.4–28.8)	19.0%[a,c,d] (17.5–20.6)	11.4%[a,b,d] (10.3–12.4)	7.2%[a,b,c] (6.4–8.1)
Unintended pregnancy in the past year	3.1%[d] (2.1–4.1)	3.1%[c,d] (2.4–3.9)	1.8%[b,d] (1.3–2.3)	0.3%[a,b,c] (0.0–0.5)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table D.79
Method of Contraception, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Birth control method at time of most-recent vaginal sex					
No contraception	17.1%[b,c] (16.0–18.1)	24.3%[a] (21.5–27.0)	23.1%[a] (20.4–25.8)	20.0% (16.7–23.3)	16.8% (11.5–22.2)
Highly effective contraception	29.4%[b,c,d] (28.2–30.7)	17.1%[a] (14.9–19.3)	20.7%[a,d] (18.4–23.0)	14.3%[a,c,e] (11.6–17.0)	23.5%[d] (18.6–28.5)
Other contraception[z]	32.0% (30.5–33.4)	32.6% (29.5–35.7)	34.2% (31.1–37.3)	32.8% (28.2–37.5)	37.3% (30.3–44.3)
Not applicable	21.5%[b,d] (20.2–22.8)	26.0%[a] (23.1–28.9)	22.0%[d] (19.1–24.9)	32.8%[a,c,e] (28.6–37.1)	22.4%[d] (17.2–27.6)
Birth control method at time of unintended pregnancy					
No contraception[z]	63.4% (52.1–74.7)	81.6% (70.3–92.9)	NR (51.9–85.5)	NR (NR)	NR (NR)
Highly effective contraception[z]	2.3% (0.1–4.4)	0.6% (0.0–1.8)	3.5% (0.0–8.4)	NR (NR)	NR (NR)
Other contraception[z]	34.3% (23.1–45.5)	17.8% (6.5–29.1)	NR (11.4–44.2)	NR (NR)	NR (NR)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.80
Method of Contraception, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Birth control method at time of most-recent vaginal sex				
No contraception	12.4%[b,c,d] (10.2–14.6)	16.4%[a,c,d] (14.9–17.9)	22.9%[a,b,d] (21.6–24.3)	34.2%[a,b,c] (32.7–35.8)
Highly effective contraception	12.8%[b,c,d] (10.8–14.8)	23.0%[a,c,d] (21.4–24.6)	38.3%[a,b] (36.7–39.9)	36.8%[a,b] (35.3–38.3)
Other contraception	45.3%[b,c,d] (42.3–48.4)	35.8%[a,c,d] (33.9–37.7)	22.3%[a,b,d] (20.9–23.7)	14.3%[a,b,c] (13.1–15.4)
Not applicable	29.5%[b,c,d] (26.8–32.2)	24.8%[a,c,d] (23.0–26.6)	16.5%[a,b] (15.3–17.6)	14.7%[a,b] (13.6–15.8)
Birth control method at time of past year unintended pregnancy[z]				
No contraception[z]	NR (51.7–82.5)	68.6% (58.0–79.2)	76.4% (66.1–86.7)	NR (NR)
Highly effective contraception[x]	1.7% (0.0–4.3)	1.0% (0.0–2.3)	3.5% (0.0–7.5)	NR (NR)
Other contraception[z]	NR (15.9–46.4)	30.5% (20.0–41.0)	20.1% (10.4–29.7)	NR (NR)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.81
Deployment-Related Contraceptive Counseling and Access (Women Only), by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Contraceptive counseling prior to deployment	25.4%[c] (20.2–30.7)	39.0% (29.9–48.1)	47.3%[a] (36.4–58.1)	NR (25.6–59.5)	NR (13.3–49.1)
Able to get or refill preferred birth control before deployed[z]	86.6% (79.4–93.8)	82.0% (72.0–92.0)	NR (55.9–86.7)	NR (NR)	NR (NR)
Able to get or refill preferred birth control while deployed[z]	79.1% (69.1–89.1)	73.0% (58.5–87.6)	NR (51.3–84.1)	NR (NR)	NR (NR)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly difference from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.82
Deployment-Related Contraceptive Counseling and Access (Women Only), by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Contraceptive counseling prior to deployment[z]	34.4% (20.5–48.3)	35.6% (29.0–42.2)	35.8% (29.5–42.1)	20.9% (15.3–26.4)
Able to get or refill preferred birth control before deployed[z]	84.0% (69.9–98.1)	78.1% (69.5–86.7)	87.9% (81.2–94.7)	80.9% (68.4–93.4)
Able to get or refill preferred birth control while deployed[z]	NR (NR)	73.8% (63.0–84.6)	72.8% (61.3–84.3)	NR (35.3–72.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.83
Deployment-Related Contraceptive Counseling and Access (Men Only), by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Contraceptive counseling prior to deployment[z]	14.9% (12.3–17.5)	13.5% (8.3–18.7)	18.3% (12.3–24.3)	12.2% (5.3–19.0)	22.0% (8.3–35.8)
Able to get or refill preferred birth control before deployed[x]	14.8% (7.1–22.6)	5.0% (0.0–10.2)	5.9% (0.0–15.8)	10.9% (0.0–26.3)	NR (NR)
Able to get or refill preferred birth control while deployed[z]	17.1% (7.9–26.2)	5.7% (0.0–12.0)	12.0% (0.3–23.7)	NR (0.0–39.8)	NR (NR)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.84
Deployment-Related Contraceptive Counseling and Access (Men Only), by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Contraceptive counseling prior to deployment[z]	11.0% (4.2–17.8)	16.7% (12.8–20.7)	16.6% (13.6–19.6)	12.9% (10.4–15.3)
Able to get or refill preferred birth control before deployed[z]	NR (2.3–44.4)	11.0% (2.8–19.3)	12.6% (5.8–19.5)	5.3% (1.8–8.9)
Able to get or refill preferred birth control while deployed[x]	NR (15.3–63.3)	10.3% (1.3–19.4)	9.3% (3.0–15.5)	7.1% (2.2–12.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.85
HIV Testing, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
HIV test in past 12 months	70.3%[b,d] (68.8–71.7)	77.0%[a,d] (74.1–79.9)	74.0%[d] (71.0–76.9)	62.0%[a,b,c] (57.2–66.7)	70.1% (64.0–76.3)
HIV test in past 6 months	36.8%[b,c,d] (35.4–38.2)	45.4%[a,d] (42.2–48.7)	41.8%[a,d] (38.6–45.0)	30.4%[a,b,c] (26.6–34.3)	36.4% (29.8–42.9)
High risk[1] for HIV tested in past 12 months	76.4%[b] (72.5–80.3)	87.9%[a,d] (83.3–92.5)	78.5% (71.2–85.9)	69.5%[b] (56.7–82.2)	88.8% (81.3–96.3)
Men who had sex with men in the past 12 months tested in past 6 months[z]	66.3% (55.7–76.9)	NR (47.4–86.9)	NR (56.1–94.2)	NR (48.2–96.9)	NR (NR)
Men who had sex with men in the past 12 months tested in past 12 months[z]	82.4% (73.4–91.3)	89.3% (75.4–100.0)	89.9% (79.5–100.0)	NR (60.3–100.0)	NR (NR)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Table D.86
HIV Testing, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
HIV test in past 12 months	61.0%[b,c,d] (58.0–64.0)	74.3%[a,c] (72.5–76.1)	78.0%[a,b,d] (76.7–79.4)	73.2%[a,c] (71.8–74.6)
HIV test in past 6 months	36.2%[b] (33.3–39.2)	42.0%[a,c,d] (40.0–43.9)	38.6%[b,d] (37.0–40.2)	33.1%[b,c] (31.6–34.5)
High risk[1] for HIV tested in past 12 months	70.6%[b,c] (64.7–76.5)	85.9%[a] (82.9–89.0)	84.2%[a] (80.7–87.8)	78.8% (73.7–83.9)
Men who had sex with men in the past 12 months tested in past 6 months[z]	NR (50.0–86.5)	70.8% (59.5–82.0)	56.5% (43.0–69.9)	66.7% (52.4–81.0)
Men who had sex with men in the past 12 months tested in past 12 months[z]	NR (63.4–94.9)	85.9% (77.5–94.4)	84.8% (74.6–95.1)	93.5% (87.3–99.6)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

[1] *High risk* was defined as male service members who had sex with one or more men in the past year, service members who had vaginal or anal sex with more than one partner in the past year, and service members who had a past-year STI (CDC, 2019b).

Chapter Nine: Sexual Orientation and Health

Table D.87
LGB Identity, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
LGB[z]	6.0% (5.2–6.7)	6.2% (4.8–7.6)	6.6% (5.1–8.1)	5.3% (3.6–7.0)	10.3% (6.7–13.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.88
LGB Identity, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
LGB	9.1%[c,d] (7.5–10.7)	6.9%[c,d] (5.9–7.8)	3.6%[a,b,d] (3.1–4.1)	2.5%[a,b,c] (2.1–3.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Chapter Ten: Deployment Experience and Health

Lifetime Number of Deployments

Table D.89
Lifetime Number of Deployments, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
1 time[x]	22.3% (21.1–23.5)	19.1% (16.8–21.3)	21.2% (18.7–23.6)	17.5% (14.3–20.8)	16.1% (11.3–20.8)
2 times	14.1%[b,c] (13.3–15.0)	10.7%[a] (9.1–12.3)	10.9%[a] (9.3–12.5)	10.9% (8.6–13.2)	14.9% (10.3–19.6)
3 or more times	21.2%[b,c,d] (20.2–22.1)	13.3%[a,e] (11.7–15.0)	13.1%[a,e] (11.6–14.7)	13.5%[a,e] (10.9–16.0)	26.9%[b,c,d] (21.6–32.1)
I have never been deployed	42.4%[b,c,d] (40.8–43.9)	56.9%[a,e] (53.9–60.0)	54.8%[a,e] (51.7–57.9)	58.1%[a,e] (53.8–62.4)	42.1%[b,c,d] (35.1–49.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[e] Statistically significantly different from Other estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

Table D.90
Lifetime Number of Deployments, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
1 time	11.8%[b,c,d] (10.0–13.7)	28.0%[a,c,d] (26.2–29.8)	22.1%[a,b] (20.8–23.5)	20.4%[a,b] (19.1–21.7)
2 times	1.3%[b,c,d] (0.7–1.8)	13.6%[a,c,d] (12.3–14.9)	21.8%[a,b] (20.4–23.1)	20.8%[a,b] (19.5–22.1)
3 or more times	1.0%[b,c,d] (0.5–1.4)	11.2%[a,c,d] (10.0–12.3)	37.1%[a,b,d] (35.6–38.7)	44.6%[a,b,c] (43.0–46.2)
I have never been deployed	85.9%[b,c,d] (84.0–87.9)	47.3%[a,c,d] (45.3–49.2)	19.0%[a,b,d] (17.8–20.2)	14.2%[a,b,c] (13.1–15.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Lifetime Number of Combat Deployments

Table D.91
Lifetime Number of Combat Zone Deployments, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
I have not had any combat zone deployments	17.6%[b,c,d] (16.3–18.9)	22.7%[a] (19.2–26.2)	25.3%[a] (21.7–28.8)	26.6%[a] (20.8–32.5)	22.9% (16.3–29.4)
1 deployment[z]	42.7% (41.1–44.3)	43.9% (40.0–47.7)	41.8% (38.0–45.5)	36.8% (31.2–42.3)	36.2% (28.5–43.9)
2 deployments[z]	23.0% (21.7–24.2)	21.3% (18.3–24.3)	20.6% (17.6–23.5)	26.2% (21.2–31.2)	24.9% (18.0–31.7)
3 or more deployments	16.7%[b,c,d] (15.7–17.7)	12.1%[a] (9.8–14.4)	12.4%[a] (10.2–14.5)	10.4%[a] (7.3–13.4)	16.1% (11.3–20.9)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.92
Lifetime Number of Combat Zone Deployments, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
I have not had any combat zone deployments	56.5%[b,c,d] (49.2–63.8)	22.5%[a,c,d] (20.4–24.7)	12.6%[a,b] (11.4–13.7)	13.7%[a,b] (12.4–14.9)
1 deployment	40.3%[b] (33.0–47.5)	50.8%[a,c,d] (48.1–53.4)	37.8%[b] (36.0–39.6)	35.7%[b] (34.0–37.3)
2 deployments	2.3%[b,c,d] (0.4–4.1)	19.3%[a,c,d] (17.3–21.4)	27.6%[a,b] (26.0–29.3)	27.3%[a,b] (25.8–28.9)
3 or more deployments	1.0%[b,c,d] (0.0–2.3)	7.4%[a,c,d] (6.1–8.6)	22.0%[a,b] (20.5–23.5)	23.3%[a,b] (21.9–24.7)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Lifetime Duration of Deployments

Table D.93
Lifetime Duration of Deployments, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
1 to 6 months[z]	12.9% (11.7–14.0)	16.2% (13.2–19.1)	14.1% (11.2–16.9)	16.0% (11.6–20.5)	11.3% (7.4–15.2)
7 to 12 months[z]	30.9% (29.3–32.5)	30.2% (26.5–34.0)	34.7% (30.9–38.4)	32.8% (27.0–38.7)	29.4% (21.9–36.8)
13 to 24 months[z]	28.8% (27.4–30.2)	28.0% (24.6–31.4)	29.1% (25.7–32.5)	28.4% (23.3–33.5)	29.3% (22.1–36.4)
25 to 48 months	20.9%[c] (19.7–22.0)	17.9% (15.1–20.7)	15.7%[a] (13.3–18.1)	16.9% (12.7–21.1)	23.7% (16.8–30.6)
49 months or more[z]	6.6% (6.0–7.2)	7.7% (5.8–9.6)	6.4% (4.8–8.0)	5.8% (3.5–8.2)	6.3% (3.6–9.1)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[c] Statistically significantly different from Hispanic estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.94
Lifetime Duration of Deployments, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
1 to 6 months	40.5%[b,c,d] (33.4–47.6)	15.3%[a,c,d] (13.5–17.1)	8.8%[a,b] (7.9–9.8)	8.9%[a,b] (7.8–9.9)
7 to 12 months	52.3%[c,d] (45.0–59.6)	42.3%[c,d] (39.7–44.9)	22.2%[a,b] (20.7–23.7)	19.9%[a,b] (18.5–21.2)
13 to 24 months	5.5%[b,c,d] (2.7–8.3)	28.0%[a,c] (25.6–30.4)	33.2%[a,b] (31.5–34.9)	30.5%[a] (28.9–32.1)
25 to 48 months	1.4%[b,c,d] (0.0–2.9)	11.9%[a,c,d] (10.3–13.6)	26.8%[a,b] (25.2–28.5)	28.4%[a,b] (26.9–30.0)
49 months or more	0.3%[c,d] (0.0–0.9)	2.5%[c,d] (1.7–3.4)	8.9%[a,b,d] (7.9–10.0)	12.3%[a,b,c] (11.2–13.4)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Duration of Recent Deployments

Table D.95
Total Duration of Deployments in the Past 12 Months, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
I did not deploy in the past 12 months	69.1%[b,c,d] (67.5–70.6)	61.0%[a] (57.1–64.9)	62.7%[a] (59.0–66.5)	58.6%[a] (52.6–64.5)	61.6% (53.9–69.4)
Less than 1 month[z]	3.1% (2.5–3.7)	2.2% (0.9–3.4)	2.1% (1.0–3.3)	2.8% (1.3–4.4)	4.1% (1.7–6.6)
1 to 3 months[x]	7.2% (6.3–8.0)	4.9% (3.1–6.6)	5.0% (3.2–6.7)	9.3% (5.8–12.9)	6.4% (3.5–9.2)
4 to 6 months[z]	6.2% (5.5–7.0)	7.3% (5.2–9.4)	8.4% (6.2–10.6)	10.1% (6.0–14.2)	7.6% (4.2–10.9)
7 to 9 months[z]	6.8% (5.8–7.7)	8.9% (6.4–11.4)	7.5% (5.5–9.5)	7.3% (4.0–10.5)	11.9% (5.5–18.3)
10 to 12 months	7.7%[b,c] (6.7–8.7)	15.7%[a] (12.7–18.7)	14.3%[a] (11.6–17.0)	12.0% (8.0–16.0)	8.4% (3.5–13.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[d] Statistically significantly different from non-Hispanic Asian estimate.

[x] At the aggregate, the chi-square test was statistically significant; however, none of the individual pairwise comparisons was.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.96
Total Duration of Deployments in the Past 12 Months, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
I did not deploy in the past 12 months	32.6%[b,c,d] (25.6–39.5)	63.5%[a,c,d] (61.0–66.1)	72.9%[a,b] (71.3–74.5)	73.8%[a,b] (72.4–75.3)
Less than 1 month	7.4%[b,c,d] (3.7–11.1)	2.3%[a] (1.4–3.1)	2.5%[a] (1.9–3.0)	3.1%[a] (2.6–3.7)
1 to 3 months	16.7%[b,c,d] (11.4–21.9)	5.8%[a] (4.6–7.0)	6.3%[a] (5.4–7.1)	5.6%[a] (4.8–6.3)
4 to 6 months	15.0%[b,c,d] (10.2–19.7)	8.0%[a,c,d] (6.7–9.3)	5.2%[a,b] (4.4–5.9)	4.7%[a,b] (4.0–5.4)
7 to 9 months	12.7%[c,d] (7.6–17.8)	9.1%[c,d] (7.5–10.8)	5.8%[a,b] (4.9–6.6)	4.6%[a,b] (3.9–5.3)
10 to 12 months	15.7%[c,d] (9.9–21.5)	11.3%[c,d] (9.5–13.0)	7.4%[a,b] (6.5–8.4)	8.2%[a,b] (7.3–9.2)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

Lifetime Combat Trauma Exposure

Table D.97
Lifetime Combat Trauma Experiences During Deployment, by Race/Ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic Asian	Other
Any traumatic combat experience	42.9%[c] (41.3–44.5)	38.1% (34.4–41.8)	36.5%[a] (32.9–40.1)	37.2% (31.6–42.8)	37.4% (29.9–45.0)
I worked with landmines or other unexploded ordnance	12.4%[b,c] (11.4–13.5)	7.9%[a] (5.8–10.0)	7.7%[a] (5.6–9.8)	9.1% (5.6–12.6)	11.9% (6.8–17.0)
I witnessed members of my unit or an ally unit being seriously wounded or killed[z]	24.1% (22.7–25.4)	20.9% (17.8–24.0)	20.3% (17.3–23.3)	21.3% (16.6–26.0)	23.6% (16.9–30.4)
Someone I knew well was killed in combat	26.5%[c,d] (25.1–27.9)	24.2% (21.0–27.4)	21.3%[a] (18.4–24.2)	18.8%[a] (14.6–23.0)	23.5% (17.3–29.7)
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement[z]	4.9% (4.3–5.6)	6.3% (4.5–8.1)	5.7% (3.7–7.6)	5.5% (2.6–8.5)	4.9% (1.9–8.0)
I was wounded in combat	3.3% (2.8–3.9)	5.4%[c] (3.6–7.3)	2.1%[b] (1.0–3.3)	2.7% (1.2–4.2)	5.5% (1.0–10.0)
I witnessed civilians being seriously wounded or killed	24.4%[b] (23.0–25.7)	18.8%[a] (15.8–21.8)	21.5% (18.4–24.6)	22.5% (17.5–27.4)	18.7% (12.5–25.0)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from non-Hispanic white estimate.

[b] Statistically significantly different from non-Hispanic black estimate.

[c] Statistically significantly different from Hispanic estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

Table D.98
Lifetime Combat Trauma Experiences During Deployment, by Age Group

	Ages 17–24	Ages 25–34	Ages 35–44	Ages 45+
Any traumatic combat experience	12.2%[b,c,d] (7.2–17.2)	37.4%[a,c,d] (34.8–40.0)	48.8%[a,b,d] (47.0–50.7)	45.3%[a,b,c] (43.6–47.1)
I worked with landmines or other unexploded ordnance	2.5%[b,c,d] (0.1–5.0)	11.0%[a] (9.3–12.7)	13.8%[a,d] (12.4–15.1)	10.3%[a,c] (9.1–11.4)
I witnessed members of my unit or an ally unit being seriously wounded or killed	5.1%[b,c,d] (1.5–8.7)	21.2%[a,c] (19.0–23.4)	28.3%[a,b,d] (26.6–30.1)	24.0%[a,c] (22.5–25.5)
Someone I knew well was killed in combat	3.9%[b,c,d] (0.8–6.9)	22.2%[a,c,d] (19.9–24.5)	31.3%[a,b,d] (29.5–33.0)	28.0%[a,b,c] (26.4–29.5)
I witnessed or engaged in acts of cruelty, excessive force, or acts violating rules of engagement[z]	3.0% (0.4–5.5)	5.1% (4.0–6.3)	6.1% (5.1–7.0)	4.6% (3.9–5.3)
I was wounded in combat	0.1%[b,c,d] (0.0–0.2)	3.4%[a] (2.4–4.4)	4.1%[a] (3.3–4.9)	3.9%[a] (3.0–4.7)
I witnessed civilians being seriously wounded or killed	7.3%[b,c,d] (3.2–11.3)	20.6%[a,c] (18.5–22.8)	28.9%[a,b,d] (27.2–30.6)	23.4%[a,c] (21.9–24.8)

NOTES: All data are weighted. 95-percent CIs are presented in parentheses.

[a] Statistically significantly different from ages 17–24 estimate.

[b] Statistically significantly different from ages 25–34 estimate.

[c] Statistically significantly different from ages 35–44 estimate.

[d] Statistically significantly different from ages 45+ estimate.

[z] The omnibus chi-square test was not statistically significant ($p < 0.05$).

APPENDIX E

Missing Data and Imputation Method Detail

Introduction

Steps taken to address missing data in the 2018 HRBS were overviewed in Chapter Two. Recall that the package mice in R (Van Buuren and Groothuis-Oudshoorn, 2011) was used to create imputations. Here, we elaborate on issues encountered and decisions made through the process of developing imputations. We focus on the process used to account for skip logic, the selection of imputation methods for general classes of variables, and convergence issues encountered with mice.

Skip Logic

The survey instrument contains both parent questions (e.g., "Did you deploy in the past year?") and child questions (e.g., "For how long did you deploy?"). Child questions are asked only of those who provided certain responses to the parent questions. Even though some child questions would not be relevant given a particular value on the associated parent question, all child questions were imputed. A postimputation editing process determined which imputed values should be overwritten as legitimate skips. That is, if a respondent had an imputed value on a parent question that indicated no deployment in the prior year, a nonzero imputed value of the child question of how long the deployment lasted was retained and "cleaned" later so that the parent-child questions were consistent. In contrast, if the imputed value of the parent question indicated that the respondent did not deploy, the child question was marked as a skip. To avoid collinearity issues, the imputation model for a child question was not allowed to include a parent question (and vice versa).

Imputation Method

Binary Data

As is common practice, our plan was to use PMM for imputation of continuous and ordinal variables, logistic regression for imputation of binary variables, and polytomous regression for categorical variables. However, the survey contains a multitude of yes or no questions where the frequency of yes or no responses was small (1 percent or less). Using logistic regression resulted in imputed values that contained much higher proportions of yes responses than the observed data. In many cases, the proportion of yes responses was far outside a feasible range given the

context of the respective question. As such, other imputation approaches were considered. In total, the methods considered for imputation of binary variables included the following:

1. logreg—imputation by logistic regression
2. PMM—predictive mean matching
3. 2l.bin—two-level imputation with generalized linear mixed effects regression (GLMER)
4. EMP—Gaussian imputation following empirical distribution transformation (Robbins, 2014).

Note that mice has several other built-in methods for imputation of binary data (e.g., classification and regression trees, linear discriminant analysis, random forest imputations), but none of these other methods were able to produce imputations of HRBS data (which is likely a consequence of the dimensionality and sparsity of the data).

Tables E.1 and E.2 give examples of marginal diagnostics of the imputations found using these methods for two items: Q61_2 and Q95D (the third-to-last item in the survey and, therefore, one with the greatest amount of missingness). The two tables provide the portion of no and yes responses for the observed values of the variables and the imputed values for each of the four methods of binary imputation. In Table E.1, we see that 0.1 percent of (observed) respondents indicated being wounded by a bullet, whereas 14.7 percent of respondents imputed with logistic regression were deemed to have been wounded by a bullet. When concatenating observed data with logistic regression–based imputations, 91.4 percent of data units that indicated a bullet wound would have come from imputed data, whereas only 4.5 percent of data units were imputed for that question. We concluded that the logistic regression imputations were erroneous for this question, and similar patterns were seen across dozens of survey items

Table E.1
Q61_2: In the Past 12 Months, Were You Wounded by a Bullet?

	No (Count)	Yes (count)	No (%)	Yes (%)
Observed	32,112	21	99.9%	0.1%
Imputed: logreg	1,286	222	85.3%	14.7%
Imputed: PMM	1,503	5	99.7%	0.3%
Imputed: 2l.bin	1,507	1	99.9%	0.1%
Imputed: EMP	1,503	5	99.7%	0.3%

Table E.2
Q95: In the Past 12 Months, Have You Ever Had to Lie to People Important to You About How Much You Gambled?

	No (Count)	Yes (Count)	No (%)	Yes (%)
Observed	31,341	141	99.55%	0.45%
Imputed: logreg	2,129	30	98.61%	1.39%
Imputed: PMM	2,107	52	97.59%	2.41%
Imputed: 2l.bin	2,143	16	99.26%	0.74%
Imputed: EMP	2,143	16	99.26%	0.74%

(though only two such items are presented here). The tables also show that the marginal characteristics of imputations found using the other three methods were much more in line with the characteristics of the observed data.

We also evaluated the multivariate properties of the imputations, which was accomplished primarily through a correlation analysis. Specifically, we calculated the pairwise correlations across all variables using only observed data, and for each method of imputation, we calculated the same correlations using only imputed data. Then, for each pair of variables, we took the absolute difference of the correlation based on observed data with respect to the correlation based on imputed data. Finally, we took the average of those absolute differences. This average provides a summary of how well each imputation method does at preserving multivariate characteristics (smaller is better). To account for the possibility that the ability of a method to preserve an association may be dependent on the strength of that association, we segmented these findings based on the strength of the baseline value of the correlation (which is the correlation calculated using observed data). Results are in Table E.3.

From the table, it appears first that logistic regression performed decently at preserving multivariate characteristics but was disqualified because of its poor performance at preserving univariate characteristics. In addition, GLMER performed the worst of the four methods in terms of preserving multivariate characteristics and, as such, was not considered further. Lastly, EMP performed slightly better than PMM when all correlations were considered (i.e., the top row of the table), whereas PMM performed better than EMP at preserving larger baseline correlations (i.e., the bottom row of the table).

Note that Robbins, 2014, argues that EMP performs comparably to PMM but is significantly more computationally efficient. However, in this case, the computational improvements were mitigated by the fact that the bulk of the computation time was spent on polytomous regression (which must be used for all methods to impute categorical variables). Ultimately, PMM was selected for imputation of binary variables because it is a well-established and widely used procedure (unlike EMP, which is not built into any widely used imputation software package). For final imputations, we applied mice with a burn-in period of 100 iterations to create a single imputed data set (which constitutes the analytic file). However, four other imputed data sets were created independently in the event that a data user wants to apply multiple imputation.

Table E.3
Correlation Summary (in Terms of) Across Imputation Methods

Strength of Baseline Correlation, Observed Data	logreg	PMM	2l.bin	EMP
All	0.110	0.119	0.140	0.111
(0.00, 0.05]	0.094	0.107	0.106	0.088
(0.05, 0.10]	0.107	0.122	0.137	0.107
(0.10, 0.20]	0.128	0.127	0.175	0.131
(0.20, 1.00]	0.180	0.167	0.284	0.221

NOTE: Correlations represent the average absolute difference between pairwise correlations found using observed versus imputed data units.

Convergence

Mice, as described above, implements fully conditional specification (FCS; Van Buuren, 2018), in which imputations are generated by allowing each variable to depend on all other variables in the data. FCS is known to sample imputations from incoherent joint distributions (Little and Rubin, 2019) and therefore may fail to converge (or may diverge) across iterations of MCMC. However, most references that discuss convergence in FCS methods (e.g., White, Royston, and Wood, 2011; Van Buuren, 2018) recommend the use of a small number of iterations of MCMC (usually as low as five, which is the default in mice). Although we accept existing arguments that five iterations should be sufficient in such methods, we tested the algorithm with 100 iterations of MCMC to see whether convergence issues would be observed.

When FCS with 100 iterations was used for imputation, we noticed that for binary questions where the vast majority of respondents selected one answer (most commonly "no"), there appeared to be some possible divergence. In particular, we saw evidence that the frequency of the less popular answer (e.g., "yes") was notably higher in imputations generated with 100 iterations of FCS than when considering the observed data or when compared with imputations generated using five iterations of FCS. Tables E.4 and E.5 show marginal distributions (across observed versus imputed data) for three representative questions, which we use to provide evidence that the algorithm may be diverging at higher iterations. In addition, Table E.6 provides an analogue of Table E.3 (wherein correlation diagnostics are provided) that is used to examine the effect of increasing the number of MCMC iterations on bivariate diagnostics. However, it appears that increasing the number of iterations improves, if anything, bivariate performance of the imputations.

Table E.4
Q40A: In the Past 12 Months, Have You Used Marijuana or Hashish?

	Yes (Count)	No (Count)	Yes (%)	No (%)
Observed	253	32,846	0.76%	99.24%
Imputed: fully conditional, 5 iterations	3	539	0.55%	99.45%
Imputed: fully conditional, 100 iterations	21	521	3.87%	96.13%
Imputed: sequentially specified, 5 iterations	5	537	0.92%	99.08%
Imputed: sequentially specified, 100 iterations	8	534	1.48%	98.52%

Table E.5
Q95: In the Past 12 Months, Have You Ever Had to Lie to People Important to You About How Much You Gambled? (Marginal Distributions)

	Yes (Count)	No (Count)	Yes (%)	No (%)
Observed	141	31,341	0.45%	99.55%
Imputed: fully conditional, 5 iterations	30	2,129	1.39%	98.61%
Imputed: fully conditional, 100 iterations	52	2,107	2.41%	97.59%
Imputed: sequentially specified, 5 iterations	16	2,143	0.74%	99.26%
Imputed: sequentially specified, 100 iterations	16	2,143	0.74%	99.26%

Table E.6
Correlation Summary for Convergence Diagnostics

Strength of Baseline Correlation, Observed Data	Fully Conditional (FCS), 5 Iterations	Fully Conditional (FCS), 100 Iterations	Sequentially, 5 Iterations	Sequentially, 100 Iterations
All	0.1040	0.0989	0.0933	0.0949
(0.00, 0.05]	0.0786	0.1088	0.0753	0.0770
(0.05, 0.10]	0.1112	0.1417	0.0989	0.1025
(0.10, 0.20]	0.1344	0.1460	0.1220	0.1216
(0.20, 1.00]	0.2090	0.1955	0.1569	0.1545

NOTE: Correlations represent the average absolute difference between pairwise correlations found using observed versus imputed data units.

We were unable to verify whether this problem would be exacerbated when more than 100 iterations are run due to time constraints. Specifically, the 100-iteration version of FCS in the 2018 HRBS data took four to five days to run. Although the issues with the 100-iteration version of FCS were not as extreme as those with the logistic regression method, our diagnostics led to the conclusion that the imputations produced using 100 iterations of FCS were implausible and likely erroneous. Therefore, we doubt the quality of imputations generated using five iterations of this method as well.

As a remedy, we considered a modified imputation model that built dependence sequentially instead of fully. In this model, Q1 would be allowed to depend only on covariates. Furthermore, Q2 would be allowed to depend upon covariates and Q1, whereas Q3 would be allowed to depend only on covariates, Q1, and Q2. Only the final question (Q97D) would be allowed to depend upon all other variables in the data. Sequential modeling in this fashion is designed to result in a sampling mechanism that mimics one that samples from a true joint distribution. Note that sequential modeling is prudent for missingness that occurs in a monotonic manner (i.e., if one variable is missing for a given case, all subsequent variables are also missing for that case). However, it may lead to bias if missingness is not monotonic. In the 2018 HRBS data, 94 percent of missing values were due to dropout, whereas 6 percent were due to refusal. As such, the missingness is nearly monotonic, which makes HRBS a good candidate for sequential modeling. Sequential modeling was implemented by setting the elements in the upper triangle of the mice parameter "predictionMatrix" to be zero.

Tables E.4 and E.5 also show marginal distributions for imputations created using a sequential model generated using five iterations and other such imputations generated using 100 iterations. We did not see evidence of divergence when a sequential model was used. Table E.6 provides bivariate correlations for imputations generated using a sequential model. The bivariate diagnostics from sequentially modeled imputations are improved over those found from imputations generated via FCS. Thus, our final imputation model utilized a five-iteration, sequential approach.

References

Abdul-Rahman, A. K., T. R. Card, M. J. Grainge, and K. M. Fleming, "All-Cause and Cause-Specific Mortality Rates of Patients Treated for Alcohol Use Disorders: A Meta-Analysis," *Substance Abuse*, Vol. 39, No. 4, 2018, pp. 509–517.

Acosta, Joie D., Amariah Becker, Jennifer L. Cerully, Michael P. Fisher, Laurie T. Martin, Raffaele Vardavas, Mary Ellen Slaughter, and Terry L. Schell, *Mental Health Stigma in the Military*, Santa Monica, Calif.: RAND Corporation, RR-426-OSD, 2014. As of May 21, 2020: https://www.rand.org/pubs/research_reports/RR426.html

Afifi, T. O., D. A. Brownridge, H. MacMillan, and J. Sareen, "The Relationship of Gambling to Intimate Partner Violence and Child Maltreatment in a Nationally Representative Sample," *Journal of Psychiatric Research*, Vol. 44, No. 5, April, 2010, pp. 331–337.

Akinbami, L. J., and C. D. Fryar, "Current Asthma Prevalence by Weight Status Among Adults: United States, 2001–2014," *NCHS Data Brief*, No. 239, March 2016, pp. 1–8.

Alegria, A. A., N. M. Petry, D. S. Hasin, S. M. Liu, B. F. Grant, and C. Blanco, "Disordered Gambling Among Racial and Ethnic Groups in the US: Results from the National Epidemiologic Survey on Alcohol and Related Conditions," *CNS Spectrums*, Vol. 14, No. 3, March 2009, pp. 132–142.

Algur, E., E. Wang, H. S. Friedman, and B. Deperthes, "A Systematic Global Review of Condom Availability Programs in High Schools," *Journal of Adolescent Health*, Vol. 64, No. 3, March 2019, pp. 292–304.

American Association for Public Opinion Research, *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*, 9th edition, 2016. As of March 26, 2020: https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, Washington, D.C.: American Psychiatric Publishing, 2013.

Ames, Genevieve M., Michael R. Duke, Roland S. Moore, and Carol B. Cunradi, "The Impact of Occupational Culture on Drinking Behavior of Young Adults in the U.S. Navy," *Journal of Mixed Methods Research*, Vol. 3, No. 2, 2008, pp. 129–150.

Army Public Health Center, *Health of the Force: Creating a Healthier Force for Tomorrow*, Washington, D.C.: United States Army, November 2015. As of March 26, 2020: https://www.army.mil/e2/c/downloads/419337.pdf

Atwoli, L., D. J. Stein, K. C. Koenen, and K. A. McLaughlin, "Epidemiology of Posttraumatic Stress Disorder: Prevalence, Correlates and Consequences," *Current Opinions in Psychiatry,* Vol. 28, No. 4, July 2015, pp. 307–311.

Aune, D., A. Sen, M. Prasad, T. Norat, I. Janszky, S. Tonstad, P. Romundstad, and L. J. Vatten, "BMI and All Cause Mortality: Systematic Review and Non-Linear Dose-Response Meta-Analysis of 230 Cohort Studies with 3.74 Million Deaths Among 30.3 Million Participants," *BMJ*, Vol. 353, May 4, 2016, p. i2156.

Ballard, S. L., J. J. Wellborn-Kim, and K. A. Clauson, "Effects of Commercial Energy Drink Consumption on Athletic Performance and Body Composition," *The Physician and Sportsmedicine*, Vol. 38, No. 1, April 2010, pp. 107–117.

Barnoya, J., and S. A. Glantz, "Cardiovascular Effects of Secondhand Smoke: Nearly as Large as Smoking," *Circulation*, Vol. 111, No. 20, May 24, 2005, pp. 2684–2698.

Belmont, P. J., B. D. Owens, and A. J. Schoenfeld, "Musculoskeletal Injuries in Iraq and Afghanistan: Epidemiology and Outcomes Following a Decade of War," *Journal of the American Academy of Orthopaedic Surgeons*, Vol. 24, No. 6, June 2016, pp. 341–348.

Benjamini, Y., and Y. Hochberg, "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing," *Journal of the Royal Statistical Society*, Series B, Vol. 57, No. 1, 1995, pp. 289–300.

Benjet, C., E. Bromet, E. G. Karam, R. C. Kessler, K. A. McLaughlin, A. M. Ruscio, V. Shahly, D. J. Stein, M. Petukhova, E. Hill, J. Alonso, L. Atwoli, B. Bunting, R. Bruffaerts, J. M. Caldas-de-Almeida, G. de Girolamo, S. Florescu, O. Gureje, Y. Huang, J. P. Lepine, N. Kawakami, V. Kovess-Masfety, M. E. Medina-Mora, F. Navarro-Mateu, M. Piazza, J. Posada-Villa, K. M. Scott, A. Shalev, T. Slade, M. ten Have, Y. Torres, M. C. Viana, Z. Zarkov, and K. C. Koenen, "The Epidemiology of Traumatic Event Exposure Worldwide: Results from the World Mental Health Survey Consortium," *Psychological Medicine*, Vol. 46, No. 2, January 2016, pp. 327–343.

Berchick, Edward R., Jessica C. Barnett, and Rachel D. Upton, *Health Insurance Coverage in the United States: 2018*, Washington, D.C.: U.S. Census Bureau, P60-267(RV), 2019.

Bertakis, K. D., R. Azari, L. J. Helms, E. J. Callahan, and J. A. Robbins, "Gender Differences in the Utilization of Health Care Services," *Journal of Family Practice*, Vol. 49, No. 2, February 2000, pp. 147–152.

Birtwistle, Mike, and Alexandra Earnshaw, *Saving Lives, Averting Costs: An Analysis of the Financial Implications of Achieving Earlier Diagnosis of Colorectal, Lung and Ovarian Cancer*, London: Incisive Health, September 2014.

Blanco, C., D. S. Hasin, N. Petry, F. S. Stinson, and B. F. Grant, "Sex Differences in Subclinical and DSM-IV Pathological Gambling: Results from the National Epidemiologic Survey on Alcohol and Related Conditions," *Psychological Medicine*, Vol. 36, No. 7, July 2006, pp. 943–953.

Bliese, P. D., K. M. Wright, A. B. Adler, O. Cabrera, C. A. Castro, and C. W. Hoge, "Validating the Primary Care Posttraumatic Stress Disorder Screen and the Posttraumatic Stress Disorder Checklist with Soldiers Returning from Combat," *Journal of Consulting Clinical Psychology*, Vol. 76, No. 2, April 2008, pp. 272–281.

Bodenheimer, T., E. Chen, and H. D. Bennett, "Confronting the Growing Burden of Chronic Disease: Can the U.S. Health Care Workforce Do the Job?" *Health Affairs (Millwood)*, Vol. 28, No. 1, January–February 2009, pp. 64–74.

Bøg, Martin, Trine Filges, and Anne Marie Klint Jørgensen, "Deployment of Personnel to Military Operations: Impact on Mental Health and Social Functioning," *Campbell Systematic Reviews*, Vol. 14, No. 1, 2018, pp. 1–127.

Bowers, L., "Reasons for Admission and Their Implications for the Nature of Acute Inpatient Psychiatric Nursing," *Journal of Psychiatric and Mental Health Nursing*, Vol. 12, No. 2, April 2005, pp. 231–236.

Breslin, Rachel A., Lisa Davis, Kimberly Hylton, Ariel Hill, William Klauberg, Mark Petsuky, and Ashlea Klahr, *2018 Workplace and Gender Relations Survey of Active Duty Members*, Office of People Analytics: Alexandria, Va., May 2019.

Brown, Gregory K., Thomas Ten Have, Gregg R. Henriques, Sharon X. Xie, Judd E. Hollander, and Aaron T. Beck, "Cognitive Therapy for the Prevention of Suicide Attempts: A Randomized Controlled Trial," *JAMA*, Vol. 294, No. 5, 2005, pp. 563–570.

Bryan, Craig, AnnaBelle Bryan, Alexis May, and E. David Klonsky, "Trajectories of Suicide Ideation, Nonsuicidal Self-Injury, and Suicide Attempts in a Nonclinical Sample of Military Personnel and Veterans," *Suicide and Life-Threatening Behavior*, Vol. 45, No. 3, September 25, 2014.

Bryan, C. J., J. Mintz, T. A. Clemans, B. Leeson, T. S. Burch, S. R. Williams, E. Maney, and M. D. Rudd, "Effect of Crisis Response Planning vs. Contracts for Safety on Suicide Risk in U.S. Army Soldiers: A Randomized Clinical Trial," *Journal of Affective Disorders*, Vol. 212, April 1, 2017, pp. 64–72.

Burton, W. N., C. Y. Chen, D. J. Conti, A. B. Schultz, G. Pransky, and D. W. Edington, "The Association of Health Risks with On-The-Job Productivity," *Journal of Occupational and Environmental Medicine*, Vol. 47, No. 8, August 2005, pp. 769–777.

Buttorff, Christine, Teague Ruder, and Melissa Bauman, *Multiple Chronic Conditions in the United States*, Santa Monica, Calif.: RAND Corporation, TL-221-PFCD, 2017. As of May 21, 2020: https://www.rand.org/pubs/tools/TL221.html

Canham-Chervak, Michelle, Tomoko I. Hooper, Fred H. Brennan Jr., Stephen C. Craig, Deborah C. Girasek, Richard A. Schaefer, Galen Barbour, Kenneth S. Yew, and Bruce H. Jones, "A Systematic Process to Prioritize Prevention Activities Sustaining Progress Toward the Reduction of Military Injuries," *American Journal of Preventive Medicine*, Vol. 38, January 31, 2010, pp. S11–S18.

Carson, V., A. E. Staiano, and P. T. Katzmarzyk, "Physical Activity, Screen Time, and Sitting Among US Adolescents," *Pediatric Exercise Science*, Vol. 27, No. 1, February 2015, pp. 151–159.

CDC—*See* Centers for Disease Control and Prevention.

Center for Behavioral Health Statistics and Quality, "Tables 1.77B and 1.78B," *Results from the 2012 National Survey on Drug Use and Health: Detailed Tables*, 2013.

Center for Behavioral Health Statistics and Quality, *National-Level Comparisons of Mental Health Estimates from the National Survey on Drug Use and Health (NSDUH) and Other Data Sources: NSDUH Methodological Report*, Rockville, Md.: Substance Abuse and Mental Health Services Administration, 2018. As of March 26, 2020: https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHC2MentalHealthEst2018.pdf

Centers for Disease Control and Prevention, "About Adult BMI," web page, 2015a. As of July 19, 2020: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/

Centers for Disease Control and Prevention, "About Child & Teen BMI," web page, 2015b. As of July 19, 2020: https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html

Centers for Disease Control and Prevention, *Age-Adjusted Percentage (with Standard Errors) of Adults Aged 18 and Over Who Met the Healthy People 2020 Objective for Sufficient Sleep, by Sex and Selected Characteristics: United States, Annualized, 2011–2014*, 2015c. As of March 26, 2020: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2011-2014_AHB_Table_SLP-2.pdf

Centers for Disease Control and Prevention, "BRFSS Prevalence & Trends Data," September 13, 2017. As of March 26, 2020: https://www.cdc.gov/brfss/brfssprevalence/

Centers for Disease Control and Prevention, "Age-Adjusted Percent Distributions (with Standard Errors) of Participation in Leisure-Time Aerobic and Muscle-Strengthening Activities That Meet the 2008 Federal Physical Activity Guidelines Among Adults Aged 18 and Over, by Selected Characteristics: United States, 2017," 2018a. As of July 22, 2019: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2017_SHS_Table_A-14.pdf

Centers for Disease Control and Prevention, "QuickStats: Age-Adjusted Percentages of Current Smokers Among Adults Aged >/=18 Years, by Sex, Race, and Hispanic Origin—National Health Interview Survey, 2016," *Morbidity and Mortality Weekly Report*, Vol. 67, No. 1, January 12, 2018b, p. 49.

Centers for Disease Control and Prevention, *2018 BRFSS Questionnaire*, January 18, 2018c. As of March 26, 2020: https://www.cdc.gov/brfss/questionnaires/pdf-ques/2018_BRFSS_English_Questionnaire.pdf

Centers for Disease Control and Prevention, "Arthritis: National Statistics," February 7, 2018d. As of March 26, 2020: https://www.cdc.gov/arthritis/data_statistics/national-statistics.html

Centers for Disease Control and Prevention, *2019 National Health Interview Survey Instrument*, 2019a. As of November 14, 2019: https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fnchs%2Fnhis%2Fquest_data_related_1997_forward.htm

Centers for Disease Control and Prevention, "HIV Testing 101," July 2019b. As of March 26, 2020: https://www.cdc.gov/hiv/pdf/library/factsheets/hiv-testing-101-info-sheet.pdf

Cha, Susan, Mingjing Xia, Teresa Finlayson, Catlainn Sionean, Anna Teplinskaya, Elana Morris, Kristin Haeger, Dafna Kanny, and Cyprian Wejnert, *HIV Infection Risk, Prevention, and Testing Behaviors Among Men Who Have Sex With Men: National HIV Behavioral Surveillance, 23 U.S. Cities, 2017*, Centers for Disease Control and Prevention, February 2019. As of March 26, 2020: https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-special-report-number-22.pdf

Cochran, Susan D., Vickie M. Mays, and J. Greer Sullivan, "Prevalence of Mental Disorders, Psychological Distress, and Mental Health Services Use Among Lesbian, Gay, and Bisexual Adults in the United States," *Journal of Consulting Clinical Psychology*, Vol. 71, No. 1, 2003, pp. 53–61.

Cohen, G. H., D. S. Fink, L. Sampson, and S. Galea, "Mental Health Among Reserve Component Military Service Members and Veterans," *Epidemiologic Reviews*, Vol. 37, No. 1, 2015, pp. 7–22.

Cohen, Pieter, and Erin Edgar, "Keep Unsafe Energy Drinks Off Bases," *Stars and Stripes*, March 4, 2013.

Cohen, S. P., R. M. Gallagher, S. A. Davis, S. R. Griffith, and E. J. Carragee, "Spine-Area Pain in Military Personnel: A Review of Epidemiology, Etiology, Diagnosis, and Treatment," *Spine Journal*, Vol. 12, No. 9, September 2012, pp. 833–842.

Cook, B. L., S. S. Hou, S. Y. Lee-Tauler, A. M. Progovac, F. Samson, and M. J. Sanchez, "A Review of Mental Health and Mental Health Care Disparities Research: 2011–2014," *Medical Care Research and Review*, June 1, 2018.

Copen, C. E., "Condom Use During Sexual Intercourse Among Women and Men Aged 15–44 in the United States: 2011–2015 National Survey of Family Growth," *National Health Statistics Report*, No. 105, August 2017, pp. 1–18.

Copen, C. E., A. Chandra, and I. Febo-Vazquez, "Sexual Behavior, Sexual Attraction, and Sexual Orientation Among Adults Aged 18–44 in the United States: Data from the 2011–2013 National Survey of Family Growth," *National Health Statistics Report*, No. 88, January 7, 2016, pp. 1–14.

Copp, Tara, "Deploy or Get Out: New Pentagon Plan Could Boot Thousands of Non-Deployable Troops," *Military Times*, February 5, 2018a.

Copp, Tara, "Goodbye, Tape Test? Sweeping DoD Fitness Review Underway," *Military Times*, February 5, 2018b.

Coughlin, Steven S, Pablo Aliaga, Shannon Barth, Stephanie Eber, Jessica Maillard, Clare Mahan, Han K. Kang, Aaron Schneiderman, Samar DeBakey, Patricia Vanderwolf, and Meredith Williams, "The Effectiveness of a Monetary Incentive on Response Rates in a Survey of Recent U.S. Veterans," *Survey Practice*, Vol. 4, No. 1, January 31, 2011.

Crosby, A. E., B. Han, L. A. Ortega, S. E. Parks, and J. Gfroerer, "Suicidal Thoughts and Behaviors Among Adults Aged >/=18 Years—United States, 2008–2009," *Morbidity and Mortality Weekly Report Surveillance Summary*, Vol. 60, No. 13, October 21, 2011, pp. 1–22.

Crowley, S. K., L. L. Wilkinson, L. T. Wigfall, A. M. Reynolds, S. T. Muraca, S. H. Glover, N. R. Wooten, X. Sui, M. W. Beets, J. L. Durstine, R. D. Newman-Norlund, and S. D. Youngstedt, "Physical Fitness and Depressive Symptoms During Army Basic Combat Training," *Medicine and Science in Sports and Exercise*, Vol. 47, No. 1, January 2015, pp. 151–158.

Cucciare, M. A., A. G. Sadler, M. A. Mengeling, J. C. Torner, G. M. Curran, X. Han, and B. M. Booth, "Associations between deployment, military rank, and binge drinking in active duty and Reserve/National Guard US Servicewomen," *Drug Alcohol and Dependence*, Vol. 153, 2015, pp. 37–42.

Curtin, S., and H. Hedegaard, "Suicide Rates for Females and Males by Race and Ethnicity: United States, 1999 and 2017," NCHS Health E-Stat, Centers for Disease Control and Prevention, 2019.

Defense and Veterans Brain Injury Center, *DoD Numbers for Traumatic Brain Injury: Worldwide Totals*, Falls Church, Va., 2018.

Defense Health Agency, *DD Form 3024, Annual Periodic Health Assessment*, April 2016. As of March 26, 2020: https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd3024.pdf

Department of Defense Directive 1308.1, *DoD Physical Fitness and Body Fat Programs*, Washington, D.C., June 30, 2004.

Department of Defense Instruction 1010.01, *Military Personnel Drug Abuse Testing Program (MPDATP)*, Washington, D.C.: U.S. Department of Defense, September 13, 2012.

Department of Defense Instruction 1010.4, *Drug and Alcohol Abuse by DoD Personnel*, Washington, D.C.: U.S. Department of Defense, September 3, 1997, incorporating Change 1, January 11, 1999.

Department of Defense Instruction 1010.10, *Health Promotion and Disease Prevention*, Washington, D.C.: U.S. Department of Defense, April 28, 2014, incorporating Change 2, January 12, 2018.

Department of Defense Instruction 1308.3, *DoD Physical Fitness and Body Fat Programs Procedures*, Washington, D.C., November 5, 2002.

Department of Defense Instruction 6490.03, *Deployment Health*, August 11, 2006. As of March 26, 2020: https://www.public.navy.mil/IA/Documents/649003p.pdf

Department of Defense Instruction 6485.01, *Human Immunodeficiency Virus (HIV) in Military Service Members*, June 7, 2013. As of March 26, 2020: https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/648501p.pdf

Department of Defense Office of the Assistant Secretary for Health Affairs, *DACOWITS 2016 Physical Standards Recommendations: Responses and Update on DoD Physical Standards (Height/Weight/Body Fat Policies)*, Washington, D.C., June 15, 2018.

DeSalvo, K. B., N. Bloser, K. Reynolds, J. He, and P. Muntner, "Mortality Prediction with a Single General Self-Rated Health Question. A Meta-Analysis," *Journal of General Internal Medicine*, Vol. 21, No. 3, March 2006, pp. 267–275.

DeSalvo, K. B., W. P. Fisher, K. Tran, N. Bloser, W. Merrill, and J. Peabody, "Assessing Measurement Properties of Two Single-Item General Health Measures," *Quality of Life Research*, Vol. 15, No. 2, March 2006, pp. 191–201.

DoD—*See* U.S. Department of Defense.

DoDI—*See* Department of Defense Instruction.

Douglas, J. M., Jr., and K. A. Fenton, "Understanding Sexual Health and Its Role in More Effective Prevention Programs," *Public Health Reports*, Vol. 128, Supp. 1, March–April 2013, pp. 1–4.

Dowling, N. A., S. S. Merkouris, V. Manning, R. Volberg, S. J. Lee, S. N. Rodda, and D. I. Lubman, "Screening for Problem Gambling Within Mental Health Services: A Comparison of the Classification Accuracy of Brief Instruments," *Addiction*, Vol. 113, No. 6, June 2018, pp. 1088–1104.

Duncan, D. T., S. Zweig, H. R. Hambrick, and J. J. Palamar, "Sexual Orientation Disparities in Prescription Opioid Misuse Among U.S. Adults," *American Journal of Preventive Medicine*, Vol. 56, No. 1, January 2019, pp. 17–26.

Dunn, Olive Jean, "Multiple Comparisons Among Means," *Journal of the American Statistical Association*, Vol. 56, No. 293, 1961, pp. 52–64.

Edwards, P. J., I. Roberts, M. J. Clarke, C. DiGuiseppi, R. Wentz, I. Kwan, R. Cooper, L. M. Felix, and S. Pratap, "Methods to Increase Response to Postal and Electronic Questionnaires," *Cochrane Database of Systemic Reviews*, No. 3, July 8, 2009, p. Mr000008.

Escobar, J. I., B. Cook, C. N. Chen, M. A. Gara, M. Alegría, A. Interian, and E. Diaz, "Whether Medically Unexplained or Not, Three or More Concurrent Somatic Symptoms Predict Psychopathology and Service Use in Community Populations," *Journal of Psychosomatic Research*, Vol. 69, No. 1, July 2010, pp. 1–8.

Finer, L. B., and M. R. Zolna, "Declines in Unintended Pregnancy in the United States, 2008–2011," *New England Journal of Medicine*, Vol. 374, No. 9, March 3, 2016, pp. 843–852.

Fink, D. S., M. S. Gallaway, M. B. Tamburrino, I. Liberzon, P. Chan, G. H. Cohen, L. Sampson, E. Shirley, T. Goto, N. D'Arcangelo, T. Fine, P. L. Reed, J. R. Calabrese, and S. Galea, "Onset of Alcohol Use Disorders and Comorbid Psychiatric Disorders in a Military Cohort: Are There Critical Periods for Prevention of Alcohol Use Disorders?" *Prevention Science*, Vol. 17, No. 3, April 2016, pp. 347–356.

Ford, E. S., T. J. Cunningham, W. H. Giles, and J. B. Croft, "Trends in Insomnia and Excessive Daytime Sleepiness Among U.S. Adults from 2002 to 2012," *Sleep Medicine*, Vol. 16, No. 3, March 2015, pp. 372–378.

Franklin, J. C., J. D. Ribeiro, K. R. Fox, K. H. Bentley, E. M. Kleiman, X. Huang, K. M. Musacchio, A. C. Jaroszewski, B. P. Chang, and M. K. Nock, "Risk Factors for Suicidal Thoughts and Behaviors: A Meta-Analysis of 50 Years of Research," *Psychological Bulletin*, Vol. 143, No. 2, February 2017, pp. 187–232.

Frayne, S. M., K. M. Skinner, L. M. Sullivan, T. J. Tripp, C. S. Hankin, N. R. Kressin, and D. R. Miller, "Medical Profile of Women Veterans Administration Outpatients Who Report a History of Sexual Assault Occurring While in the Military," *Journal of Womens' Health and Gender-Based Medicine*, Vol. 8, No. 6, July–August 1999, pp. 835–845.

Fredriksen-Goldsen, K. I., C. Shiu, A. E. Bryan, J. Goldsen, and H. J. Kim, "Health Equity and Aging of Bisexual Older Adults: Pathways of Risk and Resilience," *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, Vol. 72, No. 3, May 1, 2017, pp. 468–478.

Freeman, Joseph D., Srikanth Kadiyala, Janice F. Bell, and Diane P. Martin, "The Causal Effect of Health Insurance on Utilization and Outcomes in Adults: A Systematic Review of US Studies," *Medical Care*, Vol. 46, No. 10, 2008, pp. 1023–1032.

Friedman, Jerome H., "Greedy Function Approximation: A Gradient Boosting Machine," *The Annals of Statistics*, Vol. 29, No. 5, 2001, pp. 1189–1232.

Gallaway, M. S., D. S. Fink, L. Sampson, G. H. Cohen, M. Tamburrino, I. Liberzon, J. Calabrese, and S. Galea, "Prevalence and Covariates of Problematic Gambling Among a US Military Cohort," *Addictive Behaviors*, Vol. 95, 2019, pp. 166–177.

Ganio, M. S., J. F. Klau, D. J. Casa, L. E. Armstrong, and C. M. Maresh, "Effect of Caffeine on Sport-Specific Endurance Performance: A Systematic Review," *Journal of Strength Conditioning Research*, Vol. 23, No. 1, January 2009, pp. 315–324.

Gerteis, J., D. Izrael, D. Deitz, L. LeRoy, R. Ricciardi, T. Miller, and J. Basu, *Multiple Chronic Conditions Chartbook*. AHRQ Publications No. Q14-0038. Rockville, Md.: Agency for Healthcare Research and Quality. April 2014.

Gierk, B., S. Kohlmann, K. Kroenke, L. Spangenberg, M. Zenger, E. Brähler, and B. Löwe, "The Somatic Symptom Scale–8 (SSS-8): A Brief Measure of Somatic Symptom Burden," *JAMA Internal Medicine*, Vol. 174, No. 3, March 2014, pp. 399–407.

Glantz, S. A., and D. W. Bareham, "E-Cigarettes: Use, Effects on Smoking, Risks, and Policy Implications," *Annual Review of Public Health*, Vol. 39, April 1, 2018, pp. 215–235.

Glied, Sherry, Stephanie Ma, and Sarah Verbofsky, "How Much of a Factor Is the Affordable Care Act in the Declining Uninsured Rate?" Issue Brief (Commonwealth Fund), Vol. 44, 2016, pp. 1–12.

Goede, S. L., K. M. Kuntz, M. van Ballegooijen, A. B. Knudsen, I. Lansdorp-Vogelaar, F. K. Tangka, D. H. Howard, J. Chin, A. G. Zauber, and L. C. Seeff, "Cost-Savings to Medicare from Pre-Medicare Colorectal Cancer Screening," *Medical Care*, Vol. 53, No. 7, July 2015, pp. 630–638.

Goetzel, R. Z., S. R. Long, R. J. Ozminkowski, K. Hawkins, S. Wang, and W. Lynch, "Health, Absence, Disability, and Presenteeism Cost Estimates of Certain Physical and Mental Health Conditions Affecting U.S. Employers," *Journal of Occupational and Environmental Medicine*, Vol. 46, No. 4, April 2004, pp. 398–412.

Gonzales, G., and C. Henning-Smith, "Health Disparities by Sexual Orientation: Results and Implications from the Behavioral Risk Factor Surveillance System," *Journal of Community Health*, Vol. 42, No. 6, December 2017, pp. 1163–1172.

Gonzales, G., J. Przedworski, and C. Henning-Smith, "Comparison of Health and Health Risk Factors Between Lesbian, Gay, and Bisexual Adults and Heterosexual Adults in the United States: Results from the National Health Interview Survey," *JAMA Internal Medicine*, Vol. 176, No. 9, September 1, 2016, pp. 1344–1351.

Gore, F. M., P. J. Bloem, G. C. Patton, J. Ferguson, V. Joseph, C. Coffey, S. M. Sawyer, and C. D. Mathers, "Global Burden of Disease in Young People Aged 10–24 Years: A Systematic Analysis," *The Lancet*, Vol. 377, No. 9783, June 18, 2011, pp. 2093–2102.

Grandou, C., L. Wallace, H. H. K. Fullagar, R. Duffield, and S. Burley, "The Effects of Sleep Loss on Military Physical Performance," *Sports Medicine*, Vol. 49, No. 8, August 2019, pp. 1159–1172.

Guh, D. P., W. Zhang, N. Bansback, Z. Amarsi, C. L. Birmingham, and A. H. Anis, "The Incidence of Co-Morbidities Related to Obesity and Overweight: A Systematic Review and Meta-Analysis," *BMC Public Health*, Vol. 9, March 25, 2009, p. 88.

Gysin-Maillart, A., S. Schwab, L. Soravia, M. Megert, and K. Michel, "A Novel Brief Therapy for Patients Who Attempt Suicide: A 24-Months Follow-Up Randomized Controlled Study of the Attempted Suicide Short Intervention Program (ASSIP)," *PLoS Medicine*, Vol. 13, No. 3, March 2016, p. e1001968.

Hafner, L. M., "Pathogenesis of Fallopian Tube Damage Caused by Chlamydia Trachomatis Infections," *Contraception*, Vol. 92, No. 2, August 2015, pp. 108–115.

Haggerty, C. L., S. L. Gottlieb, B. D. Taylor, N. Low, F. Xu, and R. B. Ness, "Risk of Sequelae After Chlamydia Trachomatis Genital Infection in Women," *Journal of Infectious Disease*, Vol. 201, Supp. 2, June 15, 2010, pp. S134–S155.

Haley, R. W., "Point: Bias from the 'Healthy Warrior Effect' and Unequal Follow-Up in Three Government Studies of Health Effects of the Gulf War," *American Journal of Epidemiology*, Vol. 148, No. 4, 1998, pp. 315–323.

Han, B., P. S. Kott, A. Hughes, R. McKeon, C. Blanco, and W. M. Compton, "Estimating the Rates of Deaths by Suicide Among Adults Who Attempt Suicide in the United States," *Journal of Psychiatric Research*, Vol. 77, June 2016, pp. 125–133.

Han, B., M. Olfson, L. Huang, and R. Mojtabai, "National Trends in Specialty Outpatient Mental Health Care Among Adults," *Health Affairs (Millwood)*, Vol. 36, No. 12, December 2017, pp. 2062–2068.

Hansen, Lucas P., Caroline Kinskey, Erin Koffel, Melissa Polusny, John Ferguson, Sonja Schmer-Galunder, and Christopher R. Erbes, "Sleep Patterns and Problems Among Army National Guard Soldiers," *Military Medicine*, Vol. 183, No. 11–12, 2018, pp. e396–e401.

Harris, E. C., and B. Barraclough, "Suicide as an Outcome for Mental Disorders. A Meta-Analysis," *British Journal of Psychiatry*, Vol. 170, March 1997, pp. 205–228.

Hatzenbuehler, M. L., and B. G. Link, "Introduction to the Special Issue on Structural Stigma and Health," *Social Science & Medicine*, Vol. 103, February 2014, pp. 1–6.

Healthy People, "FP-6: Increase the Proportion of Females at Risk of Unintended Pregnancy or Their Partners Who Used Contraception at Most Recent Sexual Intercourse," 2020a. As of November 24, 2020: https://www.healthypeople.gov/node/4462/data_details

Healthy People, "FP-16.1: Increase the Percentage of Adult Females Aged 20 to 44 Years Who Are at Risk of Unintended Pregnancy That Adopt or Continue Use of the Most Effective or Moderately Effective Methods of Contraception—Data Search," 2020b. As of November 24, 2020: https://www.healthypeople.gov/2020/data-search/Search-the-Data#objid=11508;

Healthy People, "HDS-5.1: Reduce the Proportion of Adults with Hypertension," 2020c. As of November 24, 2020:
https://www.healthypeople.gov/node/4596/data_details

Healthy People, "HDS-7: Reduce the Proportion of Adults with High Total Blood Cholesterol Levels," 2020d. As of November 24, 2020:
https://www.healthypeople.gov/node/4599/data_details

Healthy People, "HIV-14.2: Increase the Proportion of Men Who Have Sex with Men (MSM) Who Report Having Been Tested for HIV in the Past 12 Months," 2020e. As of November 24, 2020: https://www.healthypeople.gov/node/4614/data_details

Healthy People, "IVP-33: Reduce Physical Assaults," 2020f. As of November 24, 2020: https://www.healthypeople.gov/node/4771/data_details

Healthy People, "MHMD-1: Reduce the Suicide Rate," 2020g. As of November 24, 2020: https://www.healthypeople.gov/node/4804/data_details

Healthy People, "MHMD-9.1: Increase the Proportion of Adults Aged 18 Years and Older with Serious Mental Illness (SMI) Who Receive Treatment," 2020h. As of November 24, 2020: https://www.healthypeople.gov/node/4820/data_details

Healthy People, "MHMD-9.2: Increase the Proportion of Adults Aged 18 Years and Older with Major Depressive Episodes (MDEs) Who Receive Treatment," 2020i. As of November 24, 2020: https://www.healthypeople.gov/node/4821/data_details

Healthy People, "NWS-8: Increase the Proportion of Adults Who Are at a Healthy Weight," 2020j. As of November 24, 2020: https://www.healthypeople.gov/node/4967/data_details

Healthy People, "NWS-9: Reduce the Proportion of Adults Who Are Obese," 2020k. As of November 24, 2020: https://www.healthypeople.gov/node/4968/data_details

Healthy People, "PA-2.1: Increase the Proportion of Adults Who Engage in Aerobic Physical Activity of at Least Moderate Intensity for at Least 150 Minutes/Week, or 75 Minutes/Week of Vigorous Intensity, or an Equivalent Combination," 2020l. As of November 24, 2020: https://www.healthypeople.gov/node/5069/data_details

Healthy People, "PA-2.2: Increase the Proportion of Adults Who Engage in Aerobic Physical Activity of at Least Moderate Intensity for More Than 300 Minutes/Week, or More Than 150 Minutes/Week of Vigorous Intensity, or an Equivalent Combination," 2020m. As of November 24, 2020: https://www.healthypeople.gov/node/5070/data_details

Healthy People, "PA-2.3: Increase the Proportion of Adults Who Perform Muscle-Strengthening Activities on 2 or More Days of the Week," 2020n. As of November 24, 2020: https://www.healthypeople.gov/node/5071/data_details

Healthy People, "SA-14.3: Reduce the Proportion of Persons Engaging in Binge Drinking During the Past 30 Days—Adults Aged 18 Years and Older," 2020o. As of November 24, 2020: https://www.healthypeople.gov/node/5205/data_details

Healthy People, "SH-4: Increase the Proportion of Adults Who Get Sufficient Sleep," 2020p. As of November 24, 2020: https://www.healthypeople.gov/node/5261/data_details

Healthy People, "SH-4: Increase the Proportion of Adults Who Get Sufficient Sleep—Data Search," 2020q. As of November 24, 2020: https://www.healthypeople.gov/2020/data-search/Search-the-Data#objid=5261;

Healthy People, "Topics and Objectives," 2020r. As of May 21, 2020: https://www.healthypeople.gov/2020/topics-objectives

Healthy People, "TU-1.1: Reduce Cigarette Smoking by Adults," 2020s. As of November 24, 2020: https://www.healthypeople.gov/node/5287/data_details

Healthy People, "TU-1.2: Reduce Use of Smokeless Tobacco Products by Adults," 2020t. As of November 24, 2020: https://www.healthypeople.gov/node/5288/data_details

Healthy People, "TU-1.3: Reduce Use of Cigars, Cigarillos, and Little Filtered Cigars by Adults," 2020u. As of November 24, 2020: https://www.healthypeople.gov/node/5289/data_details

Heinrich, K. M., N. Jitnarin, R. R. Suminski, L. Berkel, C. M. Hunter, L. Alvarez, A. R. Brundige, A. L. Peterson, J. P. Foreyt, C. K. Haddock, and W. S. Poston, "Obesity Classification in Military Personnel: A Comparison of Body Fat, Waist Circumference, and Body Mass Index Measurements," *Military Medicine*, Vol. 173, No. 1, January 2008, pp. 67–73.

Henry J. Kaiser Family Foundation, "Key Facts About the Uninsured Population," Menlo Park, Calif., October 2014.

Hershner, S., and L. M. O'Brien, "The Impact of a Randomized Sleep Education Intervention for College Students," *Journal of Clinical Sleep Medicine*, Vol 14, No. 3, 2018, pp. 337–347.

HHS—*See* U.S. Department of Health and Human Services.

Hoge, C. W., C. A. Castro, S. C. Messer, D. McGurk, D. I. Cotting, and R. L. Koffman, "Combat Duty in Iraq and Afghanistan, Mental Health Problems, and Barriers to Care," *New England Journal of Medicine*, Vol. 351, No. 1, July 1, 2004, pp. 13–22.

Hoge, C. W., S. H. Grossman, J. L. Auchterlonie, L. A. Riviere, C. S. Milliken, and J. E. Wilk, "PTSD Treatment for Soldiers After Combat Deployment: Low Utilization of Mental Health Care and Reasons for Dropout," *Psychiatric Services*, Vol. 65, No. 8, August 1, 2014, pp. 997–1004.

Hoge, C. W., A. Terhakopian, C. A. Castro, S. C. Messer, and C. C. Engel, "Association of Posttraumatic Stress Disorder with Somatic Symptoms, Health Care Visits, and Absenteeism Among Iraq War Veterans," *American Journal of Psychiatry*, Vol. 164, No. 1, January 2007, pp. 150–153.

Hom, M. A., I. H. Stanley, M. E. Schneider, and T. E. Joiner, Jr., "A Systematic Review of Help-Seeking and Mental Health Service Utilization Among Military Service Members," *Clinical Psychology Review*, Vol. 53, April 2017, pp. 59–78.

H.R. 5515, John S. McCain National Defense Authorization Act for Fiscal Year 2019.

Hubacher, D., H. Spector, C. Monteith, P. L. Chen, and C. Hart, "Long-Acting Reversible Contraceptive Acceptability and Unintended Pregnancy Among Women Presenting for Short-Acting Methods: A Randomized Patient Preference Trial," *American Journal of Obstetrics and Gynecology*, Vol. 216, No. 2, February 2017, pp. 101–109.

Institute of Medicine, *Returning Home from Iraq and Afghanistan: Preliminary Assessment of Readjustment Needs of Veterans, Service Members, and Their Families*, Washington, D.C.: The National Academies Press, 2010.

Institute of Medicine, *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*, Washington, D.C.: The National Academies Press, 2011.

Iversen, A. C., L. van Staden, J. H. Hughes, T. Browne, N. Greenberg, M. Hotopf, R. J. Rona, S. Wessely, G. Thornicroft, and N. T. Fear, "Help-Seeking and Receipt of Treatment Among UK Service Personnel," *British Journal of Psychiatry*, Vol. 197, No. 2, August 2010, pp. 149–155.

Jacobson, Isabel G., Jaime L. Horton, Besa Smith, Timothy S. Wells, Edward J. Boyko, Harris R. Lieberman, Margaret A. K. Ryan, Tyler C. Smith, and Millennium Cohort Study Team, "Bodybuilding, Energy, and Weight-Loss Supplements Are Associated with Deployment and Physical Activity in U.S. Military Personnel," *Annals of Epidemiology*, Vol. 22, No. 5, 2012, pp. 318–330.

Jacobson, I. G., M. A. K. Ryan, T. I. Hooper, T. C. Smith, P. J. Amoroso, E. J. Boyko, G. D. Gackstetter, T. S. Wells, and N. S. Bell, "Alcohol Use and Alcohol-Related Problems Before and After Military Combat Deployment," *JAMA*, Vol. 300, No. 6, August 13, 2008, pp. 663–675.

Jakupcak, M., D. Conybeare, L. Phelps, S. Hunt, H. A. Holmes, B. Felker, M. Klevens, and M. E. McFall, "Anger, Hostility, and Aggression Among Iraq and Afghanistan War Veterans Reporting PTSD and Subthreshold PTSD," *Journal of Trauma and Stress*, Vol. 20, No. 6, December 2007, pp. 945–954.

Jina, R., and L. S. Thomas, "Health Consequences of Sexual Violence Against Women," *Best Practice & Research: Clinical Obstetrics & Gynaecology*, Vol. 27, No. 1, February 2013, pp. 15–26.

Jobes, D. A., and T. E. Joiner, "Reflections on Suicidal Ideation," *Crisis*, Vol. 40, No. 4, July 2019, pp. 227–230.

Johnson, E. E., R. M. Hamer, and R. M. Nora, "The Lie/Bet Questionnaire for Screening Pathological Gamblers: A Follow-Up Study," *Psychological Reports*, Vol. 83, No. 3, Pt. 2, December 1998, pp. 1219–1224.

Johnson, E. E., R. Hamer, R. M. Nora, B. Tan, N. Eisenstein, and C. Engelhart, "The Lie/Bet Questionnaire for Screening Pathological Gamblers," *Psychological Reports*, Vol. 80, No. 1, February 1997, pp. 83–88.

Joint Publication 1, *Doctrine for the Armed Forces of the United States*, March 25, 2013, incorporating Change 1, July 12, 2017. As of March 30, 2020:
https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp1_ch1.pdf

Jones, E., and N. T. Fear, "Alcohol Use and Misuse Within the Military: A Review," *International Review of Psychiatry*, Vol. 23, No. 2, April 2011, pp. 166–172.

Jones, B. H., D. M. Perrotta, M. L. Canham-Chervak, M. A. Nee, and J. F. Brundage, "Injuries in the Military: A Review and Commentary Focused on Prevention," *American Journal of Preventive Medicine*, Vol. 18, No. 3, Supp., April 2000, pp. 71–84.

Kapp, L., and B. S. Torreon, "Reserve Component Personnel Issues: Questions and Answers." Congressional Research Service, 2018.

Kasasbeh, E., D. S. Chi, and G. Krishnaswamy, "Inflammatory Aspects of Sleep Apnea and Their Cardiovascular Consequences," *Southern Medical Journal,* Vol. 99, No. 1, January 2006, pp. 58–67, quiz pp. 68–69, 81.

Katz-Wise, S. L., and J. S. Hyde, "Victimization Experiences of Lesbian, Gay, and Bisexual Individuals: A Meta-Analysis," *Journal of Sex Research*, Vol. 49, No. 2–3, 2012, pp. 142–167.

Kaufman, K. R., S. Brodine, and R. Shaffer, "Military Training-Related Injuries: Surveillance, Research, and Prevention," *American Journal of Preventive Medicine*, Vol. 18, No. 3, Supp., April 2000, pp. 54–63.

Kazemi, Fahimeh, Abbas Ali Gaeini, Mohammad Reza Kordi, and Nader Rahnama, "The Acute Effects of Two Energy Drinks on Endurance Performance in Female Athlete Students," *Sport Sciences for Health*, Vol. 5, No. 2, December 1, 2009, pp. 55–60.

Kennedy, J. E., L. H. Lu, M. W. Reid, F. O. Leal, and D. B. Cooper, "Correlates of Depression in U.S. Military Service Members with a History of Mild Traumatic Brain Injury," *Military Medicine*, Vol. 184, Supp. 1, March 1, 2019, pp. 148–154.

Kessler, R. C., "Posttraumatic Stress Disorder: The Burden to the Individual and to Society," *Journal of Clinical Psychiatry*, Vol. 61, Supp. 5, 2000, pp. 4–12, discussion pp. 13–14.

Kessler, R. C., G. Andrews, L. J. Colpe, E. Hiripi, D. K. Mroczek, S. L. T. Normand, E. E. Walters, and A. M. Zaslavsky, "Short Screening Scales to Monitor Population Prevalences and Trends in Non-Specific Psychological Distress," *Psychological Medicine*, Vol. 32, No. 6, 2002, pp. 959–976.

Kessler, R. C., P. R. Barker, L. J. Colpe, J. F. Epstein, J. C. Gfroerer, E. Hiripi, M. J. Howes, S. L. Normand, R. W. Manderscheid, E. E. Walters, and A. M. Zaslavsky, "Screening for Serious Mental Illness in the General Population," *Archives of General Psychiatry*, Vol. 60, No. 2, February 2003, pp. 184–189.

Kessler, Ronald, Patricia Berglund, Meyer Glantz, Doreen S. Koretz, Kathleen Merikangas, Ellen E. Walters, and Alan Zaslavsky, "Estimating the Prevalence and Correlates of Serious Mental Illness in Community Epidemiological Surveys," *Mental Health*, January 2004.

Kessler, R. C., I. Hwang, R. LaBrie, M. Petukhova, N. A. Sampson, K. C. Winters, and H. J. Shaffer, "DSM-IV Pathological Gambling in the National Comorbidity Survey Replication," *Psychological Medicine*, Vol. 38, No. 9, September 2008, pp. 1351–1360.

Killgore, W. D., D. I. Cotting, J. L. Thomas, A. L. Cox, D. McGurk, A. H. Vo, C. A. Castro, and C. W. Hoge, "Post-Combat Invincibility: Violent Combat Experiences Are Associated with Increased Risk-Taking Propensity Following Deployment," *Journal of Psychiatric Research*, Vol. 42, No. 13, October 2008, pp. 1112–1121.

Kim, A. S., H. J. Ko, J. H. Kwon, and J. M. Lee, "Exposure to Secondhand Smoke and Risk of Cancer in Never Smokers: A Meta-Analysis of Epidemiologic Studies," *International Journal of Environmental Research and Public Health*, Vol. 15, No. 9, September 11, 2018.

Kim, P. Y., J. L. Thomas, J. E. Wilk, C. A. Castro, and C. W. Hoge, "Stigma, Barriers to Care, and Use of Mental Health Services Among Active Duty and National Guard Soldiers After Combat," *Psychiatric Services*, Vol. 61, No. 6, June 2010, pp. 582–588.

Kim, P. Y., R. L. Toblin, L. A. Riviere, B. C. Kok, S. H. Grossman, and J. E. Wilk, "Provider and Nonprovider Sources of Mental Health Help in the Military and the Effects of Stigma, Negative Attitudes, and Organizational Barriers to Care," *Psychiatric Services*, Vol. 67, No. 2, February 2016, pp. 221–226.

Kish, Leslie, *Survey Sampling*, New York: John Wiley & Sons, 1968.

Knapik, J. J., "The Importance of Physical Fitness for Injury Prevention: Part 1," *Journal of Special Operations Medicine*, Vol. 15, No. 1, Spring 2015, pp. 123–127.

Knapik, J. J., M. A. Sharp, M. Canham-Chervak, K. Hauret, J. F. Patton, and B. H. Jones, "Risk Factors for Training-Related Injuries Among Men and Women in Basic Combat Training," *Medicine & Science in Sports & Exercise*, Vol. 33, No. 6, June 2001, pp. 946–954.

Knutson, K. L., A. M. Ryden, B. A. Mander, and E. Van Cauter, "Role of Sleep Duration and Quality in the Risk and Severity of Type 2 Diabetes Mellitus," *Archives of Internal Medicine*, Vol. 166, No. 16, September 18, 2006, pp. 1768–1774.

Koss, Mary P., "The Impact of Crime Victimization on Women's Medical Use," *Journal of Women's Health*, Vol. 2, No. 1, January 1, 1993, pp. 67–72.

Kranzler, H. R., and M. Soyka, "Diagnosis and Pharmacotherapy of Alcohol Use Disorder: A Review," *JAMA*, Vol. 320, No. 8, August 28, 2018, pp. 815–824.

Kredlow, M. A., M. C. Capozzoli, B. A. Hearon, A. W. Calkins, and M. W. Otto, "The Effects of Physical Activity on Sleep: A Meta-Analytic Review," *Journal of Behavioral Medicine*, Vol. 38, No. 3, June 2015, pp. 427–449.

Kroenke, K., "Patients Presenting with Somatic Complaints: Epidemiology, Psychiatric Comorbidity and Management," *International Journal of Methods of Psychiatric Research*, Vol. 12, No. 1, 2003, pp. 34–43.

Kroenke, K., R. L. Spitzer, and J. B. W. Williams, "The PHQ-15: Validity of a New Measure for Evaluating the Severity of Somatic Symptoms," *Psychosomatic Medicine*, Vol. 64, No. 2, 2002, pp. 258–266.

Lang, A. J., C. S. Rodgers, C. Laffaye, L. E. Satz, T. R. Dresselhaus, and M. B. Stein, "Sexual Trauma, Posttraumatic Stress Disorder, and Health Behavior," *Behavioral Medicine*, Vol. 28, No. 4, Winter 2003, pp. 150–158.

Larson, G. E., R. M. Highfill-McRoy, and S. Booth-Kewley, "Psychiatric Diagnoses in Historic and Contemporary Military Cohorts: Combat Deployment and the Healthy Warrior Effect," *American Journal of Epidemiology*, Vol. 167, No. 11, 2008, pp. 1269–1276.

Lauby-Secretan, Béatrice, Chiara Scoccianti, Dana Loomis, Yann Grosse, Franca Bianchini, and Kurt Straif, "Body Fatness and Cancer—Viewpoint of the IARC Working Group," *New England Journal of Medicine*, Vol. 375, No. 8, 2016, pp. 794–798.

Le, T. D., J. M. Gurney, N. S. Nnamani, K. R. Gross, K. K. Chung, Z. T. Stockinger, S. C. Nessen, A. E. Pusateri, and K. S. Akers, "A 12-Year Analysis of Nonbattle Injury Among US Service Members Deployed to Iraq and Afghanistan," *JAMA Surgery*, Vol. 153, No. 9, September 1, 2018, pp. 800–807.

LeardMann, Cynthia A., Molly L. Kelton, Besa Smith, Alyson J. Littman, Edward J. Boyko, Timothy S. Wells, Tyler C. Smith, and Millennium Cohort Study Team, "Prospectively Assessed Posttraumatic Stress Disorder and Associated Physical Activity," *Public Health Reports*, Vol. 126, No. 3, 2011, pp. 371–383.

Levy, L., and J. K. Tracy, "Gambling Disorder in Veterans: A Review of the Literature and Implications for Future Research," *Journal of Gambling Studies*, Vol. 34, No. 4, December 2018, pp. 1205–1239.

Lewis, M. A., and C. Neighbors, "Social Norms Approaches Using Descriptive Drinking Norms Education: A Review of the Research on Personalized Normative Feedback," *Journal of American College Health*, Vol. 54, No. 4, 2006, pp. 213–218.

Lieberman, H. R., T. Stavinoha, S. McGraw, A. White, L. Hadden, and B. P. Marriott, "Caffeine Use Among Active Duty U.S. Army Soldiers," *Journal of the Academy of Nutrition and Dietetics*, Vol. 112, No. 6, June 2012, pp. 902–912.

Lin, Chung-Tung Jordan, Yuanting Zhang, Ewa D. Carlton, and Serena C. Lo, *2014 FDA Health and Diet Survey*, Federal Drug Administration, May 6, 2016.

Little, Roderick J. A., "Missing-Data Adjustments in Large Surveys," *Journal of Business & Economic Statistics*, Vol. 6, No. 3, 1988, pp. 287–296.

Little, R. J. A., and D. B. Rubin, *Statistical Analysis with Missing Data*, Hoboken, N. J.: Wiley, 2019.

Löwe, B., R. L. Spitzer, J. B. W. Williams, M. Mussell, D. Schellberg, and K. Kroenke, "Depression, Anxiety and Somatization in Primary Care: Syndrome Overlap and Functional Impairment," *General Hospital Psychiatry*, Vol. 30, No. 3, May–June 2008, pp. 191–199.

Madhav, K. C., S. P. Sherchand, and S. Sherchan, "Association Between Screen Time and Depression Among US Adults," *Preventive Medicine Reports*, Vol. 8, December 2017, pp. 67–71.

Marcell, A. V., S. E. Gibbs, I. Choiriyyah, F. L. Sonenstein, N. M. Astone, J. H. Pleck, and J. K. Dariotis, "National Needs of Family Planning Among U.S. Men Aged 15 to 44 Years," *American Journal of Public Health*, Vol. 106, No. 4, April 2016, pp. 733–739.

McCaffrey, D. F., G. Ridgeway, and A. R. Morral, "Propensity Score Estimation with Boosted Regression for Evaluating Causal Effects in Observational Studies," *Psychological Methods*, Vol. 9, No. 4, December 2004, pp. 403–425.

McDevitt-Murphy, M. E., J. L. Williams, J. G Murphy, C. J. Monahan, and K. L. Bracken-Minor, "Brief Intervention to Reduce Hazardous Drinking and Enhance Coping Among OEF/OIF/OND Veterans," *Professional Psychology: Research and Practice*, Vol. 46, No. 2, 2015, pp. 83–89.

McDonald, Scott D., Paul B. Perrin, Suzzette M. Chopin, and Treven C. Pickett, "Research Made Useful for Busy Rehabilitation Providers," in Maggi A. Budd, Sigmund Hough, Stephen T. Wegener, and William Stiers, eds., *Practical Psychology in Medical Rehabilitation*, Cham, Switzerland: Springer International Publishing, 2017, pp. 547–556.

Meadows, Sarah O., Charles C. Engel, Rebecca L. Collins, Robin L. Beckman, Matthew Cefalu, Jennifer Hawes-Dawson, Molly Waymouth, Amii M. Kress, Lisa Sontag-Padilla, Rajeev Ramchand, and Kayla M. Williams, "2015 Department of Defense Health Related Behaviors Survey (HRBS)," *RAND Health Quarterly*, Vol. 8, No. 2, October 2018. As of March 24, 2020:
https://www.rand.org/pubs/periodicals/health-quarterly/issues/v8/n2/05.html

Meadows, Sarah O., Charles C. Engel, Rebecca L. Collins, Robin L. Beckman, Joshua Breslau, Erika Litvin Bloom, Michael Stephen Dunbar, Mary Lou Gilbert, David Grant, Jennifer Hawes-Dawson, Stephanie Brooks Holliday, Sarah MacCarthy, Eric R. Pedersen, Michael W. Robbins, Adam J. Rose, Jamie Ryan, Terry L. Schell, and Molly M. Simmons, *2018 Department of Defense Health Related Behaviors Survey (HRBS): Results for the Active Component*, Santa Monica, Calif.: RAND Corporation, RR-4222-OSD, 2021. As of March 15, 2021:
https://www.rand.org/pubs/research_reports/RR4222.html

Medley, Grace, Rachel N. Lipari, Jonaki Bose, Devon S. Cribb, Larry A. Kroutil, and Gretchen McHenry, "Sexual Orientation and Estimates of Adult Substance Use and Mental Health: Results from the 2015 National Survey on Drug Use and Health," *NSDUH Data Review*, October 2016.

Megari, Kalliopi, "Quality of Life in Chronic Disease Patients," *Health Psychology Research*, Vol. 1, No. 3, 2013, p. e27.

Mendola, N. D., T. C. Chen, Q. Gu, M. S. Eberhardt, and S. Saydah, "Prevalence of Total, Diagnosed, and Undiagnosed Diabetes Among Adults: United States, 2013–2016," *NCHS Data Brief*, No. 319, September 2018, pp. 1–8.

Mercer, Andrew, Andrew Caporaso, David Cantor, and Reanne Townsend, "How Much Gets You How Much? Monetary Incentives and Response Rates in Household Surveys," *Public Opinion Quarterly*, Vol. 79, No. 1, 2015, pp. 105–129.

Merenstein, D., G. L. Daumit, and N. R. Powe, "Use and Costs of Nonrecommended Tests During Routine Preventive Health Exams," *American Journal of Preventive Medicine*, Vol. 30, No. 6, June 2006, pp. 521–527.

Merrill, R. M., S. G. Aldana, J. E. Pope, D. R. Anderson, C. R. Coberley, J. J. Grossmeier, and R. W. Whitmer, "Self-Rated Job Performance and Absenteeism According to Employee Engagement, Health Behaviors, and Physical Health," *Journal of Occupational and Environmental Medicine*, Vol. 55, No. 1, January 2013, pp. 10–18.

Meyer, Ilan H., "Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence," *Psychological Bulletin*, Vol. 129, No. 5, 2003, pp. 674–697.

Milliken, C. S., J. L. Auchterlonie, and C. W. Hoge, "Longitudinal Assessment of Mental Health Problems Among Active and Reserve Component Soldiers Returning from the Iraq War," *JAMA*, Vol. 298, No. 18, 2007, pp. 2141–2148.

Moghaddam, J. F., G. Yoon, D. L. Dickerson, S. W. Kim, and J. Westermeyer, "Suicidal Ideation and Suicide Attempts in Five Groups with Different Severities of Gambling: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions," *American Journal of Addiction*, Vol. 24, No. 4, June 2015, pp. 292–298.

Mohatt, N. V., R. Boeckmann, N. Winkel, D. F. Mohatt, and J. Shore, "Military Mental Health First Aid: Development and Preliminary Efficacy of a Community Training for Improving Knowledge, Attitudes, and Helping Behaviors," *Military Medicine*, Vol. 182, No. 1, January 2017, pp. e1576–e1583.

Mojtabai, R., M. Olfson, and D. Mechanic, "Perceived Need and Help-Seeking in Adults with Mood, Anxiety, or Substance Use Disorders," *Archives of General Psychiatry*, Vol. 59, No. 1, January 2002, pp. 77–84.

Mojtabai, R., M. Olfson, N. A. Sampson, R. Jin, B. Druss, P. S. Wang, K. B. Wells, H. A. Pincus, and R. C. Kessler, "Barriers to Mental Health Treatment: Results from the National Comorbidity Survey Replication," *Psychological Medicine*, Vol. 41, No. 8, August 2011, pp. 1751–1761.

Morgan, Rachel E., and Grace Kena, *Criminal Victimization, 2016: Revised*, Bureau of Justice Statistics, October 24, 2018.

Moul, Douglas, Paul Pilkonis, Jean Miewald, Thomas Carey, and Daniel Buysse, "Preliminary Study of the Test-Retest Reliability and Concurrent Validities of the Pittsburgh Insomnia Rating Scale (PIRS)," *Sleep,* Vol. 25, 2002, pp. A246–A247.

Mullen, M. "On Total Force Fitness in War and Peace," *Military Medicine*, Vol. 175 (Supplement), 2010, pp. 1–2.

Nampiaparampil, D. E., "Prevalence of Chronic Pain After Traumatic Brain Injury: A Systematic Review," *JAMA*, Vol. 300, No. 6, August 13, 2008, pp. 711–719.

National Center for Chronic Disease Prevention and Health Promotion, "Chronic Diseases and Military Readiness," April 10, 2019. As of March 26, 2020: https://www.cdc.gov/chronicdisease/resources/publications/factsheets/military-readiness.htm

National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health, *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*, Atlanta, Ga.: Centers for Disease Control and Prevention, 2014.

National Center for Health Statistics, *National Health and Nutrition Examination Survey Questionnaire (or Examination Protocol, or Laboratory Protocol)*, Hyattsville, Md.: U.S. Department of Health and Human Services, June 3, 2016. As of March 26, 2020: https://wwwn.cdc.gov/nchs/data/nhanes/2017-2018/questionnaires/PAQ_J.pdf

National Center for Health Statistics, "Cholesterol Among Adults Aged 20 and Over, by Selected Characteristics: United States, Selected Years 1988–1994 Through 2013–2016," 2017. As of March 26, 2020: https://www.cdc.gov/nchs/data/hus/2017/055.pdf

National Center for Health Statistics, "Age-Adjusted Percent Distributions (with Standard Errors) of Participation in Leisure-Time Aerobic and Muscle-Strengthening Activities That Meet the 2008 Federal Physical Activity Guidelines Among Adults Aged 18 and Over, by Selected Characteristics: United States, 2017," Centers for Disease Control and Prevention, 2018a. As of March 26, 2020: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2017_SHS_Table_A-14.pdf

National Center for Health Statistics, *Obesity*, Centers for Disease Control and Prevention, March 2018b. As of March 26, 2020: https://www.cdc.gov/nchs/data/nhis/earlyrelease/EarlyRelease201803_06.pdf

National Defense Authorization Act for Fiscal Year 2016, 2015. As of March 26, 2020: https://www.congress.gov/114/plaws/publ92/PLAW-114publ92.pdf

National Defense Authorization Act for Fiscal Year 2017, 2016. As of March 26, 2020: https://www.congress.gov/114/crpt/hrpt840/CRPT-114hrpt840.pdf

National Institutes of Health, "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report," *Obesity Research*, Vol. 6, Supp. 2, September 1998, pp. 51s–209s.

Nevill, A. M., A. D. Stewart, T. Olds, and R. Holder, "Relationship Between Adiposity and Body Size Reveals Limitations of BMI," *American Journal of Physical Anthropology*, Vol. 129, No. 1, January 2006, pp. 151–156.

Nock, M. K., G. Borges, E. J. Bromet, J. Alonso, M. Angermeyer, A. Beautrais, R. Bruffaerts, W. T. Chiu, G. de Girolamo, S. Gluzman, R. de Graaf, O. Gureje, J. M. Haro, Y. Huang, E. Karam, R. C. Kessler, J. P. Lepine, D. Levinson, M. E. Medina-Mora, Y. Ono, J. Posada-Villa, and D. Williams, "Cross-National Prevalence and Risk Factors for Suicidal Ideation, Plans and Attempts," *British Journal of Psychiatry*, Vol. 192, No. 2, February 2008, pp. 98–105.

Odlaug, B. L., A. Gual, J. DeCourcy, R. Perry, J. Pike, L. Heron, and J. Rehm, "Alcohol Dependence, Co-Occurring Conditions and Attributable Burden," *Alcohol and Alcoholism*, Vol. 51, No. 2, March 2016, pp. 201–209.

Office of Disease Prevention and Health Promotion, "Healthy People," August 22, 2019. As of July 13, 2020: https://www.healthypeople.gov/

Office of the Under Secretary of Defense for Personnel and Readiness, *DoD Instruction 6200.06: Periodic Health Assessment (PHA) Program*, 2016. As of March 26, 2020: https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/620006p.pdf

Olfson, M., C. Blanco, and S. C. Marcus, "Treatment of Adult Depression in the United States," *JAMA Internal Medicine*, Vol. 176, No. 10, October 1, 2016, pp. 1482–1491.

Olfson, M., S. Wang, M. Wall, S. C. Marcus, and C. Blanco, "Trends in Serious Psychological Distress and Outpatient Mental Health Care of US Adults," *JAMA Psychiatry,* Vol. 76, No. 2, February 1, 2019, pp. 152–161.

Owen, Neville, Phillip B. Sparling, Geneviève N. Healy, David W. Dunstan, and Charles E. Matthews, "Sedentary Behavior: Emerging Evidence for a New Health Risk," *Mayo Clinic Proceedings*, Vol. 85, No. 12, 2010, pp. 1138–1141.

Parsons, Nicholas L., and Matthew J. Manierre, "Investigating the Relationship Among Prepaid Token Incentives, Response Rates, and Nonresponse Bias in a Web Survey," *Field Methods*, Vol. 26, No. 2, May 1, 2014, pp. 191–204.

Pedersen, E. R., L. Parast, G. N. Marshall, T. L. Schell, and C. Neighbors, "A Randomized Controlled Trial of a Web-Based, Personalized Normative Feedback Alcohol Intervention for Young-Adult Veterans," *Journal of Consulting and Clinical Psychology*, Vol. 85, No. 5, 2017, pp. 459–470.

Pepper, J. K., K. M. Ribisl, S. L. Emery, and N. T. Brewer, "Reasons for Starting and Stopping Electronic Cigarette Use," *International Journal of Environmental Research and Public Health*, Vol. 11, No. 10, October 3, 2014, pp. 10345–10361.

Peters, E. N., C. Nordeck, G. Zanetti, K. E. O'Grady, G. Serpelloni, C. Rimondo, C. Blanco, C. Welsh, and R. P. Schwartz, "Relationship of Gambling with Tobacco, Alcohol, and Illicit Drug Use Among Adolescents in the USA: Review of the Literature 2000–2014," *American Journal of Addiction*, Vol. 24, No. 3, April 2015, pp. 206–216.

Peterson, C., S. DeGue, C. Florence, and C. N. Lokey, "Lifetime Economic Burden of Rape Among U.S. Adults," *American Journal of Preventive Medicine*, Vol. 52, No. 6, June 2017, pp. 691–701.

Peterson, A. L., H. H. Severson, J. A. Andrews, S. P. Gott, J. A. Cigrang, J. S. Gordon, C. M. Hunter, and G. C. Martin, "Smokeless Tobacco Use in Military Personnel," *Military Medicine*, Vol. 172, No. 12, December 2007, pp. 1300–1305.

Prins, A., M. J. Bovin, D. J. Smolenski, B. P. Marx, R. Kimerling, M. A. Jenkins-Guarnieri, D. G. Kaloupek, P. P. Schnurr, A. P. Kaiser, Y. E. Leyva, and Q. Q. Tiet, "The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5): Development and Evaluation Within a Veteran Primary Care Sample," *Journal of General Internal Medicine*, Vol. 31, No. 10, October 2016, pp. 1206–1211.

Prins, A. M., P. Ouimette, R. Kimerling, R. P. Cameron, D. S. Hugelshofer, J. Shaw-Hegwer, A. Thrailkill, F. D. Gusman, and J. I. Sheikh, "The Primary Care PTSD Screen (PC-PTSD): Development and Operating Characteristics," *Primary Care Psychiatry*, Vol. 9, No. 1, 2004, pp. 9–14.

Pruitt, L. D., D. J. Smolenski, N. E. Bush, N. A. Skopp, A. Edwards-Stewart, and T. V. Hoyt, *Department of Defense Suicide Event Report—Calendar Year 2016 Annual Report*, Washington, D.C., 2018.

Public Law 111-148, Patient Protection and Affordable Care Act, March 23, 2010.

Quartana, P. J., J. E. Wilk, J. L. Thomas, R. M. Bray, K. L. Rae Olmsted, J. M. Brown, J. Williams, P. Y. Kim, K. Clarke-Walper, and C. W. Hoge, "Trends in Mental Health Services Utilization and Stigma in US Soldiers from 2002 to 2011," *American Journal of Public Health*, Vol. 104, No. 9, September 2014, pp. 1671–1679.

Rabinowitz, A. R., and H. S. Levin, "Cognitive Sequelae of Traumatic Brain Injury," *Psychiatric Clinics of North America*, Vol. 37, No. 1, March 2014, pp. 1–11.

Rademaker, A. R., E. Vermetten, E. Geuze, A. Muilwijk, and R. J. Kleber, "Self-Reported Early Trauma as a Predictor of Adult Personality: A Study in a Military Sample," *Journal of Clinical Psychology*, Vol. 64, No. 7, July 2008, pp. 863–875.

Ramchand, R., J. Acosta, R. M. Burns, L. H. Jaycox, and C. G. Pernin, "The War Within: Preventing Suicide in the U.S. Military," *RAND Health Quarterly*, Vol. 1, No. 1, Spring 2011. As of March 24, 2020: https://www.rand.org/pubs/periodicals/health-quarterly/issues/v1/n1/02.html

Ramchand, R., N. K. Eberhart, C. Guo, E. R. Pedersen, T. D. Savitsky, T. Tanielian, and P. Voorhies, "Developing a Research Strategy for Suicide Prevention in the Department of Defense: Status of Current Research, Prioritizing Areas of Need, and Recommendations for Moving Forward," *RAND Health Quarterly*, Vol. 4, No. 3, December 30, 2014, p. 16. As of March 24, 2020: https://www.rand.org/pubs/periodicals/health-quarterly/issues/v4/n3/16.html

Ramchand, R., R. Rudavsky, S. Grant, T. Tanielian, and L. Jaycox, "Prevalence of, Risk Factors for, and Consequences of Posttraumatic Stress Disorder and Other Mental Health Problems in Military Populations Deployed to Iraq and Afghanistan," *Current Psychiatry Reports*, Vol. 17, No. 5, May 2015, p. 37.

Ramchand, R., T. L. Schell, B. R. Karney, K. C. Osilla, R. M. Burns, and L. B. Caldarone, "Disparate Prevalence Estimates of PTSD Among Service Members Who Served in Iraq and Afghanistan: Possible Explanations," *Journal of Trauma and Stress*, Vol. 23, No. 1, February 2010, pp. 59–68.

Resnick, H., R. Acierno, A. E. Waldrop, L. King, D. King, C. Danielson, K. J. Ruggiero, and D. Kilpatrick, "Randomized Controlled Evaluation of an Early Intervention to Prevent Post-Rape Psychopathology," *Behaviour Research and Therapy*, Vol. 45, No. 10, October 2007, pp. 2432–2447.

Ridgeway, Greg, "The State of Boosting," *Computer Science and Statistics*, Vol. 31, December 1999.

Ridgeway, Greg, "Generalized Boosted Models: A Guide to the GBM Package," *Compute*, Vol. 1, 2005, pp. 1–12.

Ridgeway, Greg, and Daniel F. McCaffrey, "Comment: Demystifying Double Robustness: A Comparison of Alternative Strategies for Estimating a Population Mean from Incomplete Data," *Statistical Science*, Vol. 22, No. 4, 2007, pp. 540–543.

Ridgeway, Greg, Daniel F. McCaffrey, Andrew R. Morral, Lane F. Burgette, and Beth Ann Griffin, *Toolkit for Weighting and Analysis of Nonequivalent Groups: A Tutorial for the R TWANG Package*, Santa Monica, Calif.: RAND Corporation, TL-136/1-NIDA, 2014. As of May 21, 2020: https://www.rand.org/pubs/tools/TL136z1.html

Robbins, Michael, "The Utility of Nonparametric Transformations for Imputation of Survey Data," *Journal of Official Statistics*, Vol. 30, No. 4, December 2014.

Roerecke, M., and J. Rehm, "Alcohol Use Disorders and Mortality: A Systematic Review and Meta-Analysis," *Addiction*, Vol. 108, No. 9, September 2013, pp. 1562–1578.

Rush, T., C. A. LeardMann, and N. F. Crum-Cianflone, "Obesity and Associated Adverse Health Outcomes Among US Military Members and Veterans: Findings from the Millennium Cohort Study," *Obesity (Silver Spring)*, Vol. 24, No. 7, July 2016, pp. 1582–1589.

Sánchez-Fernández, Juan, Francisco Muñoz-Leiva, Francisco J. Montoro-Ríos, and José Ángel Ibáñez-Zapata, "An Analysis of the Effect of Pre-Incentives and Post-Incentives Based on Draws on Response to Web Surveys," *Quality & Quantity*, Vol. 44, No. 2, 2010, pp. 357–373.

Sareen, J., B. J. Cox, T. O. Afifi, M. B. Stein, S. L. Belik, G. Meadows, and G. J. Asmundson, "Combat and Peacekeeping Operations in Relation to Prevalence of Mental Disorders and Perceived Need for Mental Health Care: Findings from a Large Representative Sample of Military Personnel," *Archives of General Psychiatry*, Vol. 64, No. 7, July 2007, pp. 843–852.

Savin-Williams, R. C., "How Many Gays Are There? It Depends," *Nebraska Symposium on Motivation*, Vol. 54, 2009, pp. 5–41.

Scarpa, A., "Community Violence Exposure in Young Adults," *Trauma, Violence, & Abuse*, Vol. 4, No. 3, July 2003, pp. 210–227.

Schnurr, Paula P., "Understanding Pathways from Traumatic Exposure to Physical Health," in Ulrich Schnyder and Marylène Cloitre, eds., *Evidence-Based Treatments for Trauma-Related Psychological Disorders: A Practical Guide for Clinicians*, Cham, Switzerland: Springer International Publishing, 2015, pp. 87–103.

Schoenborn, C. A., and R. M. Gindi, "Electronic Cigarette Use Among Adults: United States, 2014," *NCHS Data Brief*, No. 217, October 2015, pp. 1–8.

Schriver, Melinda L., "No Health Insurance? It's Enough to Make You Sick," white paper of the American College of Physicians–American Society of Internal Medicine, 1999.

Schuler, M. S., C. E. Rice, R. J. Evans-Polce, and R. L. Collins, "Disparities in Substance Use Behaviors and Disorders Among Adult Sexual Minorities by Age, Gender, and Sexual Identity," *Drug and Alcohol Dependence*, Vol. 189, August 1, 2018, pp. 139–146.

Schuler, M. S., B. D. Stein, and R. L. Collins, "Differences in Substance Use Disparities Across Age Groups in a National Cross-Sectional Survey of Lesbian, Gay, and Bisexual Adults," *LGBT Health*, Vol. 6, No. 2, 2019, pp. 68–76.

Schultz, A. B., C. Y. Chen, and D. W. Edington, "The Cost and Impact of Health Conditions on Presenteeism to Employers: A Review of the Literature," *Pharmacoeconomics*, Vol. 27, No. 5, 2009, pp. 365–378.

Schultz, A. B., and D. W. Edington, "Employee Health and Presenteeism: A Systematic Review," *Journal of Occupational Rehabilitation*, Vol. 17, No. 3, September 2007, pp. 547–579.

Schumm, J. A., and K. M. Chard, "Alcohol and Stress in the Military," *Alcohol Research*, Vol. 34, No. 4, 2012, pp. 401–407.

Schwab, Karen, G. Baker, B. Ivins, M. Sluss-Tiller, W. Lux, and D. Warden, "The Brief Traumatic Brain Injury Screen (BTBIS): Investigating the Validity of a Self-Report Instrument for Detecting Traumatic Brain Injury (TBI) in Troops Returning from Deployment in Afghanistan and Iraq," *Neurology*, Vol. 66, 2006, p. A235.

Scott-Sheldon, L. A., T. B. Huedo-Medina, M. R. Warren, B. T. Johnson, and M. P. Carey, "Efficacy of Behavioral Interventions to Increase Condom Use and Reduce Sexually Transmitted Infections: A Meta-Analysis, 1991 to 2010," *Journal of Acquired Immune Deficiency Syndrome*, Vol. 58, No. 5, December 15, 2011, pp. 489–498.

Seelig, A. D., I. G. Jacobson, C. J. Donoho, D. W. Trone, N. F. Crum-Cianflone, and T. J. Balkin, "Sleep and Health Resilience Metrics in a Large Military Cohort," *Sleep*, Vol. 39, No. 5, May 1, 2016, pp. 1111–1120.

Servies, T., Z. Hu, A. Eick-Cost, and J. L. Otto, "Substance Use Disorders in the U.S. Armed Forces, 2000–2011," *Medical Surveillance Monthly Report*, Vol. 19, No. 11, November 2012, pp. 11–16.

Sexual Minority Assessment Research Team, *Best Practices for Asking Questions About Sexual Orientation on Surveys*, Williams Institute, 2009.

Sheehan, D. V., K. Harnett-Sheehan, and B. A. Raj, "The Measurement of Disability," *International Clinical Psychopharmacology*, Vol. 11, Supp. 3, June 1996, pp. 89–95.

Silverman, M. N., and P. A. Deuster, "Biological Mechanisms Underlying the Role of Physical Fitness in Health and Resilience," *Interface Focus*, Vol. 4, No. 5, October 6, 2014, p. 20140040.

Singer, E., J. Van Hoewyk, and M. P. Maher, "Experiments with Incentives in Telephone Surveys," *Public Opinion Quarterly*, Vol. 64, No. 2, Summer 2000, pp. 171–188.

Singer, Eleanor, and Cong Ye, "The Use and Effects of Incentives in Surveys," *Annals of the American Academy of Political and Social Science*, Vol. 645, No. 1, January 2013, pp. 112–141.

Sinha, D. N., R. A. Suliankatchi, P. C. Gupta, T. Thamarangsi, N. Agarwal, M. Parascandola, and R. Mehrotra, "Global Burden of All-Cause and Cause-Specific Mortality Due to Smokeless Tobacco Use: Systematic Review and Meta-Analysis," *Tobacco Control*, Vol. 27, No. 1, January 2018, pp. 35–42.

Smith, Sharon G., Xinjian Zhang, Kathleen C. Basile, Melissa T. Merrick, Jing Wang, Marcie-Jo Kresnow, and Jieru Chen, *The National Intimate Partner and Sexual Violence Survey: 2015 Data Brief–Updated Release*, Atlanta, Ga.: Centers for Disease Control and Prevention, November 2018. As of March 26, 2020: https://stacks.cdc.gov/view/cdc/60893

St-Pierre, Renee, Douglas Walker, Jeffrey Derevensky, and Rina Gupta, "How Availability and Accessibility of Gambling Venues Influence Problem Gambling: A Review of the Literature," *Gaming Law Review and Economics*, Vol. 18, No. 2, March 2014, pp. 150–172.

Stamatakis, E., M. Hamer, and D. W. Dunstan, "Screen-Based Entertainment Time, All-Cause Mortality, and Cardiovascular Events: Population-Based Study with Ongoing Mortality and Hospital Events Follow-Up," *Journal of the American College of Cardiology*, Vol. 57, No. 3, January 18, 2011, pp. 292–299.

Stander, V. A., and C. J. Thomsen, "Sexual Harassment and Assault in the U.S. Military: A Review of Policy and Research Trends," *Military Medicine*, Vol. 181, No. 1, Supp., January 2016, pp. 20–27.

Starfield, Barbara, Leiyu Shi, and James Macinko, "Contribution of Primary Care to Health Systems and Health," *Milbank Quarterly*, Vol. 83, No. 3, 2005, pp. 457–502.

Steenbergh, T. A., J. P. Whelan, A. W. Meyers, R. C. Klesges, and M. DeBon, "Gambling and Health Risk-Taking Behavior in a Military Sample," *Military Medicine*, Vol. 173, No. 5, May 2008, pp. 452–459.

Stefanovics, E. A., M. N. Potenza, and R. H. Pietrzak, "Gambling in a National U.S. Veteran Population: Prevalence, Socio-Demographics, and Psychiatric Comorbidities," *Journal of Gambling Studies*, Vol. 33, No. 4, December 2017, pp. 1099–1120.

Stein, M. B., A. J. Lang, C. Laffaye, L. E. Satz, R. J. Lenox, and T. R. Dresselhaus, "Relationship of Sexual Assault History to Somatic Symptoms and Health Anxiety in Women," *General Hospital Psychiatry*, Vol. 26, No. 3, May–June 2004, pp. 178–183.

Stephens, M. B., S. Attipoe, D. Jones, C. J. Ledford, and P. A. Deuster, "Energy Drink and Energy Shot Use in the Military," *Nutrition Reviews*, Vol. 72, Supp. 1, October 2014, pp. 72–77.

Stone, D. M., T. R. Simon, K. A. Fowler, S. R. Kegler, K. Yuan, K. M. Holland, A. Z. Ivey-Stephenson, and A. E. Crosby, "Vital Signs: Trends in State Suicide Rates—United States, 1999–2016 and Circumstances Contributing to Suicide—27 States, 2015," *Morbidity and Mortality Weekly Report*, Vol. 67, No. 22, 2018, pp. 617–624.

Strömberg, C., E. Aboagye, J. Hagberg, G. Bergstrom, and M. Lohela-Karlsson, "Estimating the Effect and Economic Impact of Absenteeism, Presenteeism, and Work Environment-Related Problems on Reductions in Productivity from a Managerial Perspective," *Value in Health*, Vol. 20, No. 8, September 2017, pp. 1058–1064.

Substance Abuse and Mental Health Services Administration, *Results from the 2017 National Survey on Drug Use and Health: Detailed Tables*, Rockville, Md., September 7, 2018. As of March 26, 2020: https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2017/NSDUHDetailedTabs2017.pdf

Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*, HHS Publication No. PEP19-5068, NSDUH Series H-54, Rockville, Md.: Center for Behavioral Health Statistics and Quality, 2019a.

Substance Abuse and Mental Health Services Administration, "National Survey on Drug Use and Health," 2019b. As of March 26, 2020: https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health

Substance Abuse and Mental Health Services Administration, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables*, Rockville, Md.: Center for Behavioral Health Statistics and Quality, 2019c. As of March 26, 2020:
https://www.samhsa.gov/data/report/2018-nsduh-detailed-tables

Sundin, J., N. T. Fear, A. Iversen, R. J. Rona, and S. Wessely, "PTSD After Deployment to Iraq: Conflicting Rates, Conflicting Claims," *Psychological Medicine*, Vol. 40, No. 3, March 2010, pp. 367–382.

Suris, A., and L. Lind, "Military Sexual Trauma: A Review of Prevalence and Associated Health Consequences in Veterans," *Trauma, Violence, and Abuse*, Vol. 9, No. 4, October 2008, pp. 250–269.

Suris, A., L. Lind, T. M. Kashner, and P. D. Borman, "Mental Health, Quality of Life, and Health Functioning in Women Veterans: Differential Outcomes Associated with Military and Civilian Sexual Assault," *Journal of Interpersonal Violence*, Vol. 22, No. 2, February 2007, pp. 179–197.

Taheri, S., "The Link Between Short Sleep Duration and Obesity: We Should Recommend More Sleep to Prevent Obesity," *Archives of Disease in Childhood*, Vol. 91, No. 11, November 2006, pp. 881–884.

Talbot, Laura A., Ali A. Weinstein, and Jerome L. Fleg, "Army Physical Fitness Test Scores Predict Coronary Heart Disease Risk in Army National Guard Soldiers," *Military Medicine*, Vol. 174, No. 3, 2009, pp. 245–252.

Tanielian, Terri and Lisa H. Jaycox, eds., *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*, Santa Monica, Calif.: RAND Corporation, MG-720-CCF, 2008. As of May 22, 2020:
https://www.rand.org/pubs/monographs/MG720.html

Taylor, J., "Bisexual Mental Health: A Call to Action," *Issues in Mental Health Nursing*, Vol. 39, No. 1, January 2018, pp. 83–92.

Teeters, Jenni B., Cynthia L. Lancaster, Delisa G. Brown, and Sudie E. Back, "Substance Use Disorders in Military Veterans: Prevalence and Treatment Challenges," *Substance Abuse and Rehabilitation*, Vol. 8, 2017, pp. 69–77.

Thomas, J. L., J. E. Wilk, L. A. Riviere, D. McGurk, C. A. Castro, and C. W. Hoge, "Prevalence of Mental Health Problems and Functional Impairment Among Active Component and National Guard Soldiers 3 and 12 Months Following Combat in Iraq," *Archives of General Psychiatry*, Vol. 67, No. 6, June 2010, pp. 614–623.

Thorp, A. A., N. Owen, M. Neuhaus, and D. W. Dunstan, "Sedentary Behaviors and Subsequent Health Outcomes in Adults: A Systematic Review of Longitudinal Studies, 1996–2011," *American Journal of Preventive Medicine*, Vol. 41, No. 2, August 2011, pp. 207–215.

Title 10 U.S. Code § 1086, *Contracts for Health Benefits for Certain Members, Former Members, and Their Dependents*, 2012. As of June 4, 2020:
https://www.law.cornell.edu/uscode/text/10/1086

Troxel, W. M., R. A. Shih, E. R. Pedersen, L. Geyer, M. P. Fisher, B. A. Griffin, A. C. Haas, J. Kurz, and P. S. Steinberg, "Sleep in the Military: Promoting Healthy Sleep Among U.S. Servicemembers," *RAND Health Quarterly,* Vol. 5, No. 2, November 30, 2015. As of May 22, 2020:
https://www.rand.org/pubs/periodicals/health-quarterly/issues/v5/n2/19.html

Tukey, J. W., "The Problem of Multiple Comparisons," in H. I. Braun, ed., *The Collected Works of John W. Tukey*, Vol. 8, 1994, New York: Chapman & Hall, 1953.

Turchik, Jessica A., and Susan M. Wilson, "Sexual Assault in the U.S. Military: A Review of the Literature and Recommendations for the Future," *Aggression and Violent Behavior*, Vol. 15, No. 4, July 2010, pp. 267–277.

U.S. Bureau of Labor Statistics, "Databases, Tables & Calculators by Subject," 2019. As of September 19, 2019:
https://data.bls.gov/timeseries/LNS14000000

U.S. Department of Defense, *Report to Congressional Defense Committees on Department of Defense Personnel Policies Regarding Members of the Armed Forces with HIV or Hepatitis B*, July 30, 2014. As of March 26, 2020:
https://health.mil/Reference-Center/Reports/2014/09/22/
DoD-Personnel-Policies-Regarding-Members-of-the-Armed-Forces-with-HIV-or-Hepatitis-B

U.S. Department of Defense, "Clinical Practice Guidelines for Access to Methods of Contraception and Contraceptive Counseling," DHA-IPM 16-003, December 20, 2016. As of March 26, 2020: https://www.med.navy.mil/sites/nmcphc/Documents/health-promotion-wellness/reproductive-and-sexual-health/dod-contraception-cpg.pdf

U.S. Department of Defense, "2017 Demographics Profile: Active Duty Members," infographic, 2017a. As of July 5, 2020: https://download.militaryonesource.mil/12038/MOS/Infographic/2017-MC%26FP-Demo-ActiveDutyMembers.pdf

U.S. Department of Defense, *2017 Demographics: Profile of the Military Community*, 2017b. As of July 5, 2020: https://download.militaryonesource.mil/12038/MOS/Reports/2017-demographics-report.pdf

U.S. Department of Defense, "2017 Demographics Profile: Selected Reserve Members," infographic, 2017c. As of July 5, 2020: https://download.militaryonesource.mil/12038/MOS/Infographic/2017-MC%26FP-Demo-SelectedReserveMembers.pdf

U.S. Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America*, Washington, D.C., 2018.

U.S. Department of Defense, *DoD Dictionary of Military and Associated Terms*, January 2020. As of March 30, 2020: https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf

U.S. Department of Defense, Defense Manpower Data Center, Reserve Components Common Personnel Data System (September 2017), Alexandria, Va.: Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, 2018.

U.S. Department of Defense Office of the Assistant Secretary for Health Affairs, *DACOWITS 2016 Physical Standards Recommendations: Responses and Update on DoD Physical Standards (Height/Weight/Body Fat Policies)*, Washington, D.C., June 15, 2018.

U.S. Department of the Army, *Army Directive 2019-12: Policy for Voluntary Alcohol-Related Behavioral Healthcare*, March 25, 2019. As of December 12, 2019: https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN16186_AD2019-12_Web_Final.pdf

U.S. Department of Health and Human Services, "Midcourse Review," 2019. As of July 29, 2019: https://www.healthypeople.gov/2020/data-search/midcourse-review/lhi

U.S. Government Accountability Office, *DoD and the Coast Guard Need to Screen for Gambling Disorder Addiction and Update Guidance*, GAO-17-114, January 30, 2017.

Van Buuren, Stef, "Flexible Imputation of Missing Data," *Journal of Statistical Software*, Vol. 85, Book Review 4, July 2, 2018, p. 5.

Van Buuren, Stef, and Karin Groothuis-Oudshoorn, "mice: Multivariate Imputation by Chained Equations in R," *Journal of Statistical Software*, Vol. 1, No. 3, December 12, 2011.

Volberg, R. A., L. M. McNamara, and K. L. Carris, "Risk Factors for Problem Gambling in California: Demographics, Comorbidities and Gambling Participation," *Journal of Gambling Studies*, Vol. 34, No. 2, June 2018, pp. 361–377.

Wall, H. K., M. D. Ritchey, C. Gillespie, J. D. Omura, A. Jamal, and M. G. George, "Vital Signs: Prevalence of Key Cardiovascular Disease Risk Factors for Million Hearts 2022—United States, 2011–2016," *Morbidity and Mortality Weekly Report*, Vol. 67, No. 35, September 7, 2018, pp. 983–991.

Waller, M., A. C. McGuire, and A. J. Dobson, "Alcohol Use in the Military: Associations with Health and Wellbeing," *Substance Abuse Treatment and Preventive Policy*, Vol. 10, July 28, 2015, p. 27.

Walters, M. L., J. Chen, and M. J. Breiding, *The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Findings on Victimization by Sexual Orientation*, Atlanta, Ga.: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, 2013.

Wang, T. W., K. Asman, A. S. Gentzke, K. A. Cullen, E. Holder-Hayes, C. Reyes-Guzman, A. Jamal, L. Neff, and B. A. King, "Tobacco Product Use Among Adults—United States, 2017," *Morbidity and Mortality Weekly Report*, Vol. 67, No. 44, November 9, 2018, pp. 1225–1232.

Warburton, Darren E. R., Crystal Whitney Nicol, and Shannon S. D. Bredin, "Health Benefits of Physical Activity: The Evidence," *Canadian Medical Association Journal*, Vol. 174, No. 6, 2006, pp. 801–809.

Ward, B. W., J. M. Dahlhamer, A. M. Galinsky, and S. S. Joestl, "Sexual Orientation and Health Among U.S. Adults: National Health Interview Survey, 2013," *National Health Statistics Reports*, No. 77, July 15, 2014, pp. 1–10.

Ware, J. E., Jr., and C. D. Sherbourne, "The MOS 36-Item Short-Form Health Survey (SF-36). I. Conceptual Framework and Item Selection," *Medical Care*, Vol. 30, No. 6, June 1992, pp. 473–483.

Watson, Julie, "Navy Loosens Body Fat Rules to Retain Sailors," *Military Times*, March 6, 2016.

Weaver, Terri L., and George A. Clum, "Psychological Distress Associated with Interpersonal Violence: A Meta-Analysis," *Clinical Psychology Review*, Vol. 15, No. 2, 1995, pp. 115–140.

Weissman, J. F., L. A. Pratt, E. A. Miller, and J. D. Parker, "Serious Psychological Distress Among Adults: United States, 2009–2013," *NCHS Data Brief*, No. 203, May 2015, pp. 1–8.

Welte, J. W., G. M. Barnes, M. C. Tidwell, J. H. Hoffman, and W. F. Wieczorek, "Gambling and Problem Gambling in the United States: Changes Between 1999 and 2013," *Journal of Gambling Studies*, Vol. 31, 2015, pp. 695–715.

White, Ian R., Patrick Royston, and Angela M. Wood, "Multiple Imputation Using Chained Equations: Issues and Guidance for Practice," *Statistics in Medicine*, Vol. 30, No. 4, 2011, pp. 377–399.

Wijndaele, Katrien, Søren Brage, Hervé Besson, Kay-Tee Khaw, Stephen J. Sharp, Robert Luben, Nicholas J. Wareham, and Ulf Ekelund, "Television Viewing Time Independently Predicts All-Cause and Cardiovascular Mortality: The EPIC Norfolk Study," *International Journal of Epidemiology*, Vol. 40, No. 1, 2010, pp. 150–159.

Wilk, J. E., P. D. Bliese, J. L. Thomas, M. D. Wood, D. McGurk, C. A. Castro, and C. W. Hoge, "Unethical Battlefield Conduct Reported by Soldiers Serving in the Iraq War," *Journal of Nervous and Mental Disease*, Vol. 201, No. 4, April 2013, pp. 259–265.

Wilmoth, Margaret, "The Reserve Component and Access to Care," Institute of Medicine, October 10, 2010.

Wilson, J., M. Jones, N. T. Fear, L. Hull, M. Hotopf, S. Wessely, and R. J. Rona, "Is Previous Psychological Health Associated with the Likelihood of Iraq War Deployment? An Investigation of the 'Healthy Warrior Effect,'" *American Journal of Epidemiology*, Vol. 169, No. 11, 2009, pp. 1362–1369.

Winner, Brooke, Jeffrey F. Peipert, Qiuhong Zhao, Christina Buckel, Tessa Madden, Jenifer E. Allsworth, and Gina M. Secura, "Effectiveness of Long-Acting Reversible Contraception," *New England Journal of Medicine*, Vol. 366, No. 21, 2012, pp. 1998–2007.

Yamin, P., M. Fei, S. Lahlou, and S. Levy, "Using Social Norms to Change Behavior and Increase Sustainability in the Real World: A Systematic Review of the Literature," *Sustainability*, Vol. 11, No. 20, 2019, p. 5847.

Zimmerman, M., J. B. McGlinchey, D. Young, and I. Chelminski, "Diagnosing Major Depressive Disorder I: A Psychometric Evaluation of the DSM-IV Symptom Criteria," *Journal of Nervous and Mental Disease*, Vol. 194, No. 3, March 2006, pp. 158–163.