

2015 Health Related Behaviors Survey

Deployment Experiences and Health Among U.S. Active-Duty Service Members

The Health Related Behaviors Survey (HRBS) is the U.S. Department of Defense (DoD)'s flagship survey for understanding the health, health-related behaviors, and well-being of service members. Fielded periodically for more than 30 years, the HRBS includes content areas—such as substance use, 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 Defense Health Agency asked the RAND Corporation to revise and field the 2015 HRBS.

In this brief, we review results for recent deployment experiences and health, including the frequency and duration of deployments, levels of exposure to combat-related experiences, the prevalence of deployment-related injuries, the prevalence of deployment-related substance use, and deployment-related mental and physical health.

Frequency and Duration of Deployments

The HRBS asked currently nondeployed service members about the start, end, and type of their most-recent deployment, as well as the total time spent deployed both in the past 12 months and since joining the military. Across all services, the majority of service members reported at least one previous deployment (61.3 percent; CI: 59.8–62.8). Among personnel who had previously deployed, 49.0 percent (CI: 47.5–50.6) reported deploying at least three times, and 64.3 percent (CI: 62.5–66.1) reported that their most-recent deployment was to a *combat zone* (defined as deployment to an area where a service member typically receives imminent danger pay, hazardous duty pay, and/or combat zone tax exclusion benefits).

Members of the Navy were the most likely to report having previously deployed (see Figure 1). Among those who had ever deployed, members of the Coast Guard were the most likely to have deployed at least three times but the least likely to report that their most-recent deployment was to a combat zone. Members of the Army were the most likely to report that their most-recent deployment was to a combat zone.

Methods:

RAND fielded the 2015 HRBS among active-duty U.S. military service members in the Air Force, Army, Marine Corps, Navy, and Coast Guard between November 2015 and April 2016. The survey used a random sampling strategy, stratified by service branch, pay grade, and gender (as obtained from Defense Manpower Data Center records). Respondents completed the anonymous survey online, with a response rate of 8.6 percent. This resulted in 16,699 usable surveys (of 201,990 invited to participate).¹ For some analyses, the number of usable surveys may differ because of differences in nonresponse for individual items. To represent the active-duty population, we weighted responses to account for the oversampling of service members in certain strata. In this research brief, we report point estimates and 95-percent confidence intervals (CIs).²

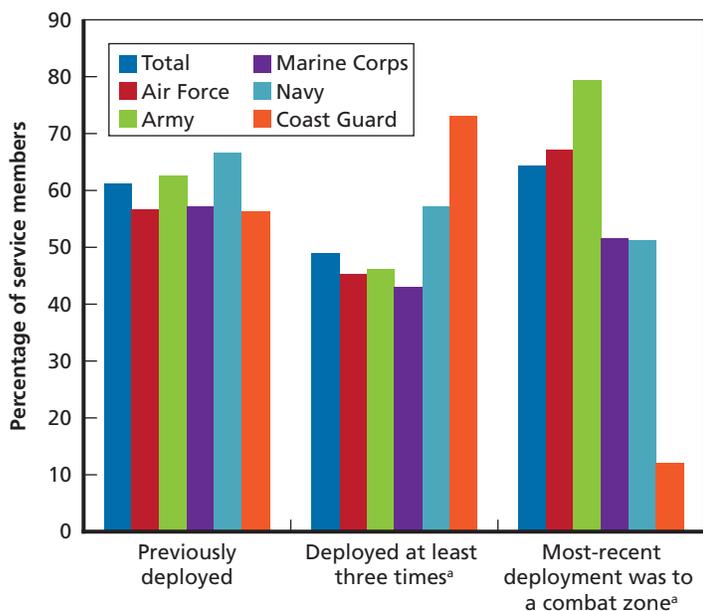
We tested differences in each outcome across levels of key factors or by subgroups—service branch, pay grade, gender, age group, race/ethnicity, and education level—using a two-stage procedure based on (1) a Rao-Scott chi-square test for overall differences across levels within a single factor and, if the overall test was statistically significant, (2) two-sample t-tests that explore all possible pairwise comparisons between levels of the factors (e.g., junior officers compared with noncommissioned senior officers). Readers interested in these differences should consult the full 2015 HRBS final report at www.rand.org/t/RR1695.

This brief is one of seven, each corresponding to a different chapter in the full report. An eighth brief summarizes the entire report.

¹ When calculating response rates, we excluded service members whom we were unable to contact because of incorrect email or mailing addresses. The number we were unable to contact was 6,770, or 3.4 percent of the sample.

² CIs provide a range in which we expect the true population value to fall. They account for sampling variability when calculating point estimates but do not account for problems with question wording, response bias, or other methodological issues that, if present in the HRBS, might bias point estimates.

Figure 1
Previously Deployed, Deployed at Least Three Times, and Most-Recent Deployment Was to a Combat Zone, by Service Branch



^a Includes only respondents who reported one or more previous combat or noncombat deployments.

Combat Experiences

Not all combat-zone deployments involve combat experiences, and not all combat experiences occur during combat-zone deployments. The HRBS therefore assessed service member reports of combat-related traumatic experiences. Altogether, the HRBS estimated that 64.9 percent (CI: 63.2–66.9) of service members who had previously deployed had any combat exposure, and 45.8 percent (CI: 44.1–47.5) had high levels of combat exposure.³ The most common combat experiences reported by service members were receiving incoming fire from small arms, artillery, rockets, or mortars (49.8 percent; CI: 48.1–51.6); being sent outside the wire on patrols, convoys, or sorties (42.1 percent; CI: 40.4–43.7); seeing dead bodies or human remains (38.6 percent; CI: 36.8–40.3); being in a unit that suffered casualties (35.6 percent; CI: 33.9–37.3); and being in a unit that fired on the enemy (35.6 percent; CI: 33.8–37.3).

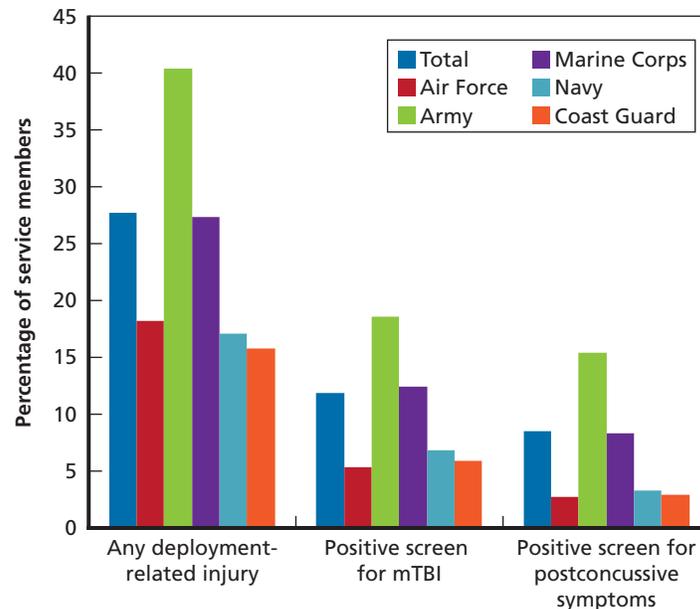
Deployment-Related Injury

Deployments and exposure to combat and other traumatic events place military personnel at increased risk of injury. Identifying injurious events that result in postconcussive symptoms or that can lead to concussion, mild traumatic brain injury (mTBI),⁴ or moderate to severe traumatic brain injury (TBI) is critical to protecting the mental health and cognitive functioning of military personnel and to preventing future deployment-related injuries.

Among service members with at least one previous deployment, 27.7 percent (CI: 26.0–29.4) reported a deployment-related injury, 11.9 percent (CI: 10.6–13.1) reported mTBI, and 8.6 percent (CI: 7.5–9.7) reported postconcussive symptoms.

Army personnel were more likely than those of other services to report any deployment injury, mTBI, or postconcussive symptoms (Figure 2). By pay grade, senior enlisted personnel were the most likely to have suffered a deployment injury, as well as mTBI or postconcussive symptoms resulting from such an injury. Men were also more likely than women to report such experiences.

Figure 2
Deployment-Related Injury, mTBI, and Postconcussive Symptoms, by Service Branch



NOTE: Figure includes only respondents who reported one or more previous combat or noncombat deployments.

³ Service members were considered to have high combat exposure if scoring in the top quartile on a checklist of 18 combat exposure events.

⁴ A positive screen for mTBI occurred when a respondent (1) reported one or more injuries during any deployment and (2) recalled having temporally related concussion or postconcussive symptoms; feeling dazed, confused, or “seeing stars”; having any associated loss of consciousness for up to 20 minutes; or being amnesic for the injury event. A positive screen for moderate to severe TBI occurred when a respondent reported that loss of consciousness lasted longer than 20 minutes. A positive screen for postconcussive symptoms required a report of mild, moderate, or severe TBI plus multiple symptoms, such as headaches, dizziness, memory problems, ringing in the ears, irritability, or sensitivity to light.

Deployment-Related Substance Use

Although the military has made progress toward reducing cigarette smoking and illicit drug use among active-duty service members, other forms of nicotine, alcohol, and prescription medication continue to be pervasive throughout the military. (For more information, see the research brief on substance use among service members.⁵) Understanding the trends in tobacco, alcohol, illicit drug, and prescription drug use during and after deployment are vital to informing policies to maintain the health and readiness of the armed forces.

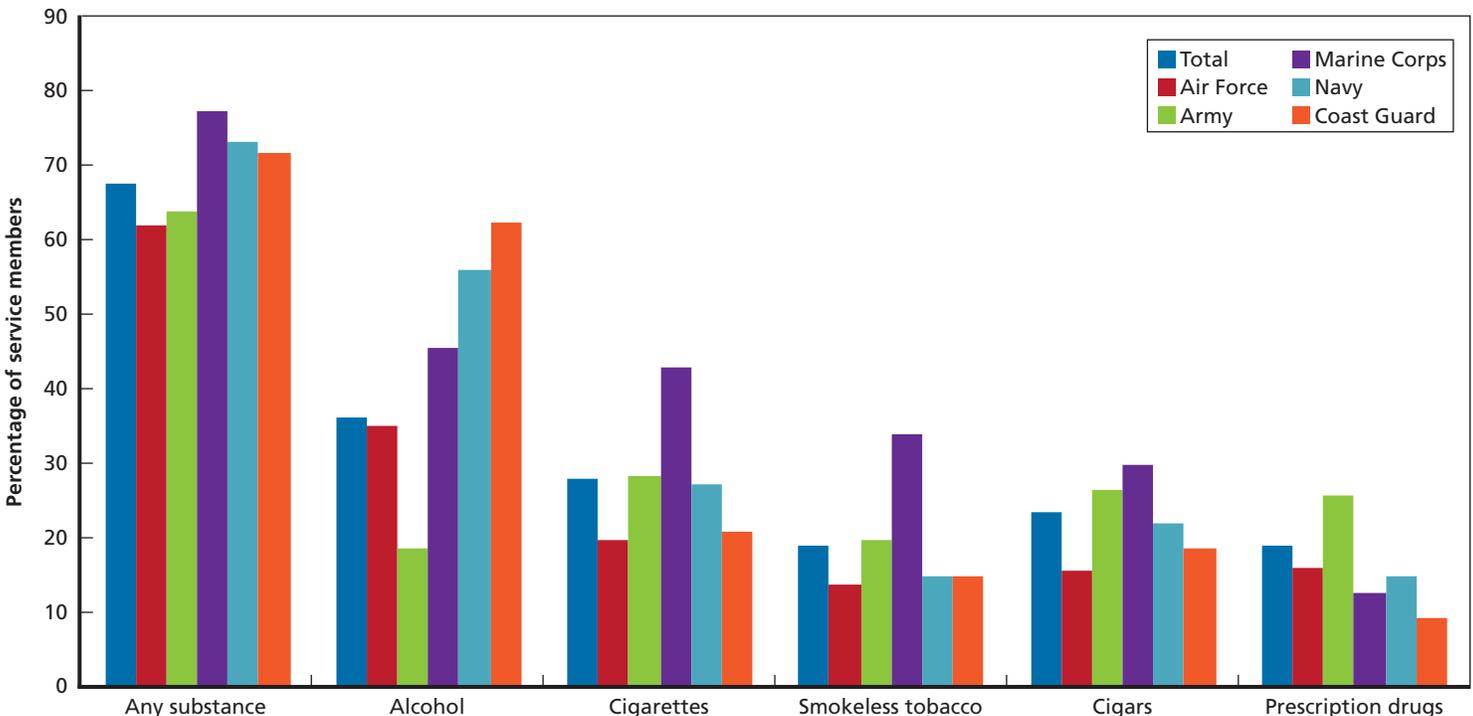
To capture the relationship of self-reported substance use and deployment, we used a modified question from the National Survey on Drug Use and Health. This item measures the frequency of use of alcohol, tobacco, smokeless tobacco, cigars, prescription medications, marijuana, opium, heroin, morphine, and related medications during the most-recent deployment. When interpreting these figures, it is important to note that DoD policies regarding alcohol use vary significantly depending on the geographic location of a deployment. For example, alcohol possession and consumption have long been banned for military personnel throughout nearly all the Middle East. In addition, a 2008 report by the Army’s Mental Health Assessment Team found lower

alcohol use in theater than was reported in the 2015 HRBS; however, comparing these results is made difficult by several factors, such as telescoping, recall biases among HRBS respondents, and the anonymity that the online HRBS afforded respondents.

Overall, 67.6 percent (CI: 65.8–69.5) of previously deployed service members reported using any substance during their most-recent deployment. Alcohol (36.2 percent; CI: 34.3–38.0) and cigarettes (28.0 percent; CI: 26.1–29.8) were among the most frequently used substances; marijuana and opiates (0.1 percent each; CI: 0.0–0.2) were the least.

Prevalence of substance use during the most-recent deployment was generally higher among Marine Corps personnel than those of other services, although there were some exceptions by substance type (see Figure 3). While Marine Corps personnel reported higher rates of using any substance overall and all three types of tobacco, Coast Guard members reported higher prevalence of alcohol use, and Army personnel reported higher prevalence of prescription medication use. By pay grade, there was no statistically significant difference in prevalence of any substance during the most-recent deployment, and men were more likely than women to report such use.

Figure 3
Substance Use During Most-Recent Deployment, by Service Branch



NOTE: Figure includes only respondents who reported one or more previous combat or noncombat deployments.

⁵ Sarah O. Meadows, Charles C. Engel, Rebecca L. Collins, Robin Beckman, Matthew Cefalu, Jennifer Hawes-Dawson, Molly Doyle, Amii M. Kress, Lisa Sontag-Padilla, Rajeev Ramchand, and Kayla M. Williams, *2015 Health Related Behaviors Survey: Substance Use Among U.S. Active-Duty Service Members*, Santa Monica, Calif.: RAND Corporation, RB-9955/7-OSD, 2018. (Available at www.rand.org/t/RB9955z7).

Service members who reported high combat exposure were more likely to report substance use during deployment than those with lower levels of such exposure, although there were differences in type of substance use. Those reporting high levels of combat exposure were more likely to report use of smokeless tobacco, cigars, and prescription drugs during their most-recent deployment, while those with lower levels of exposure were more likely to report use of alcohol.

Furthermore, when comparing substance use during the most-recent deployment, we found no statistically significant differences between those who had ever screened positive for mTBI and those who had never screened positive for TBI (mild or otherwise) (analysis restricted to those with a deployment in the past three years). However, we did find differences in type of substance use. Specifically, those with mTBI were more likely to report having used cigarettes, smokeless tobacco, or prescription drugs during their most-recent deployment, and those without TBI were more likely to use alcohol during such a deployment.

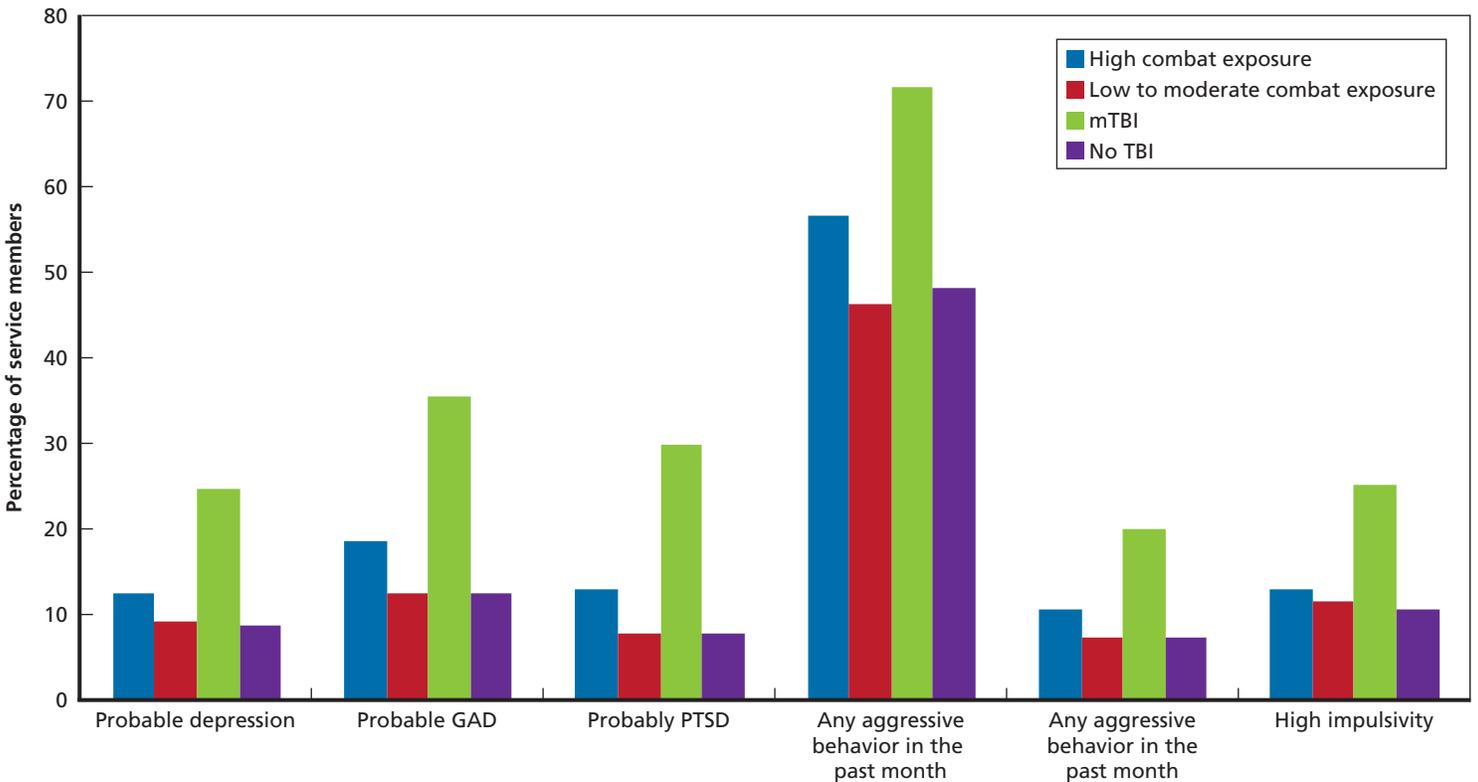
Deployment and Mental Health

Deployment in the past three years was associated with prevalence of various mental health conditions. The percentage of recently deployed service members with probable depression, generalized anxiety disorder (GAD), or posttraumatic stress disorder (PTSD) was slightly higher than the percentage among all active-duty service members. (For more on the prevalence of these conditions among all military members and how we measured them, see the research brief on service members' mental and emotional health.⁶)

Among service members deployed in the past three years, those with high levels of combat exposure were significantly more likely than others to have probable GAD, PTSD, and aggressive behavior (Figure 4). Similarly, those reporting mTBI had significantly higher prevalence of probable depression, GAD, PTSD, aggressive behavior, and impulsivity than those not reporting a TBI.

Among those with a deployment in the past three years, service members with high levels of combat exposure were

Figure 4
Mental Health Indicators and Social and Emotional Factors Associated with Mental Health, by Level of Combat Exposure and TBI Status



NOTE: Figure includes only respondents who reported one or more combat or noncombat deployments in the past three years.

⁶ Sarah O. Meadows, Charles C. Engel, Rebecca L. Collins, Robin Beckman, Matthew Cefalu, Jennifer Hawes-Dawson, Molly Doyle, Amii M. Kress, Lisa Sontag-Padilla, Rajeev Ramchand, and Kayla M. Williams, *2015 Health Related Behaviors Survey: Mental and Emotional Health Among U.S. Active-Duty Service Members*, Santa Monica, Calif.: RAND Corporation, RB-9955/3-OSD, 2018. (Available at www.rand.org/t/RB9955z3).

also more likely than those with lower levels to report suicide ideation since joining the military or during deployment. However, they were less likely to report a suicide attempt at any point in their lifetime. Recently deployed service members with mTBI were also more likely than those with no TBI to report suicide ideation in their lifetime, in the past 12 months, since joining the military, and during deployment. They were also more likely to report suicide attempts in their lifetime and since joining the military.

Deployment and Physical Health

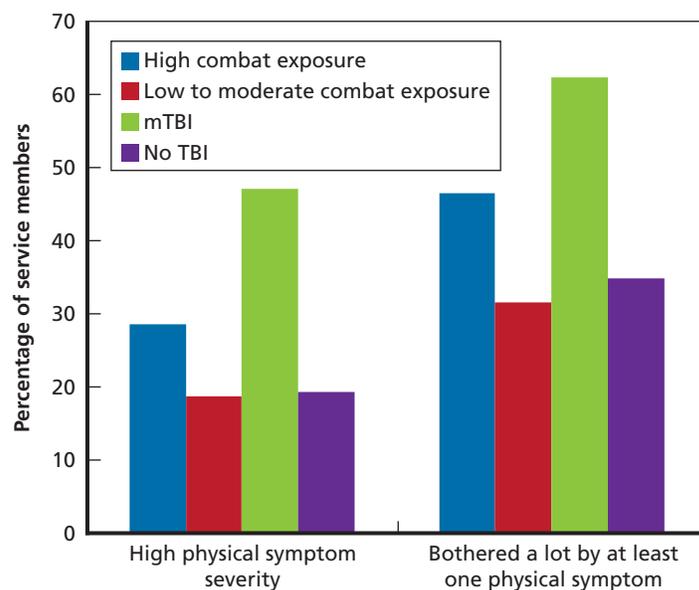
Physical health problems related to deployment and combat exposure have important implications for readiness. Understanding the prevalence of physical health issues across the services has the potential to inform early detection and treatment processes, improve general health, and mitigate impacts on readiness. (For more details on how the 2015 HRBS assessed these issues, see the research brief on service members' physical health and functional limitations.⁷)

Among service members who deployed in the past three years, those with high combat exposure or mTBI were far more likely than those without to have a high physical symptom severity score or report being bothered a lot by at least one physical symptom (including headaches) in the past month (Figure 5). Physical symptom scores summarize respondent reports of back pain; pain in the arms, legs, or joints; chest pain or shortness of breath; and headache pain.

Conclusions and Policy Implications

Taken together, these results suggest that active-duty service members have been widely exposed to combat and associated trauma in recent years. Perhaps as a result, service members

Figure 5
Physical Health, Combat Exposure, and TBI Status



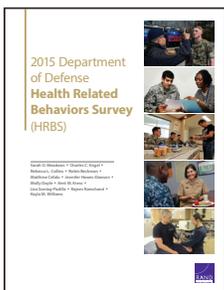
NOTE: Figure includes only respondents who reported one or more combat or noncombat deployments in the past three years.

with greater exposure showed elevated rates of probable anxiety and depressive disorders, PTSD, physical health problems (such as mTBI, postconcussive symptoms, somatic symptoms, and chronic pain), and negative health behaviors (e.g., substance use) compared with their less-exposed peers. Of note, mTBI was a significant correlate of other negative health outcomes. Future iterations of the HRBS should continue to monitor these trends in order to assess associations between deployment, combat exposure, and the health and well-being of service members.

⁷ Sarah O. Meadows, Charles C. Engel, Rebecca L. Collins, Robin Beckman, Matthew Cefalu, Jennifer Hawes-Dawson, Molly Doyle, Amii M. Kress, Lisa Sontag-Padilla, Rajeev Ramchand, and Kayla M. Williams, *2015 Health Related Behaviors Survey: Physical Health and Functional Limitations Among U.S. Active-Duty Service Members*, Santa Monica, Calif.: RAND Corporation, RB-9955/4-OSD, 2018. (Available at www.rand.org/t/RB9955z4).

Limitations

HRBS response rates were lower in 2015 than in prior iterations of the survey. Low response rates do not automatically mean that the results are biased, but they do increase the likelihood that service members who responded differ qualitatively from those who did not. Those differences, then, could bias our estimates of health and health-related behavior; however, it is impossible to know whether the potential bias would result in better or worse outcomes than those observed in the data. Thus, the results of this survey should be interpreted cautiously and in conjunction with other existing data. In addition, comparing the HRBS with other civilian populations (e.g., all U.S. adults) may be difficult to interpret because of both observed (e.g., demographic) and unobserved differences between the two populations. Finally, because we altered the wording of some questions in the 2015 HRBS, the results presented in this brief may not always be comparable to prior versions of the HRBS.



This brief describes research done in the Forces and Resources Policy Center of the RAND National Defense Research Institute and documented in *2015 Department of Defense Health Related Behaviors Survey (HRBS) of Active-Duty Service Members: Final Report*, by Sarah O. Meadows, Charles C. Engel, Rebecca L. Collins, Robin Beckman, Matthew Cefalu, Jennifer Hawes-Dawson, Molly Doyle, Amii M. Kress, Lisa Sontag-Padilla, Rajeev Ramchand, and Kayla M. Williams, RR-1695-OSD (available at www.rand.org/t/RR1695), 2018. To view this brief online, visit www.rand.org/t/RB9955z1. 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. RAND® is a registered trademark. © RAND 2018

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