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The Behavioral Health of Minority Active Duty Service Members

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Preface

The composition of the U.S. military has grown increasingly diverse since it ended conscription and began an all-volunteer force in 1973, with members of minority groups making up a larger percentage of the force than ever before. To improve the U.S. Department of Defense's (DoD's) understanding of the behavioral health needs of service members who are racial/ethnic minorities, women, or sexual orientation minorities, this study had two major aims: to compare the behavioral health outcomes of minority service members to their majority group peers; and to examine minority-majority group differences in the military versus the civilian population. The report is written with an academic audience in mind, though the conclusions and policy implications should be accessible to those without a research background.

This research was sponsored by the Psychological Health Center of Excellence 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.

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Summary

Central to maintaining a strong and ready force is ensuring the behavioral health of service members. With multiple and protracted deployments to support combat operations in Afghanistan and Iraq during the years following the September 11, 2001, terrorist attacks, a psychological toll has been exacted on service members, as evidenced by their high rates of behavioral health conditions such as posttraumatic stress disorder (PTSD), depression, suicide, and alcohol and other substance use problems.

Whereas the U.S. military has recognized the behavioral health needs of service members in general, the specific needs of racial/ethnic, gender, and sexual minority groups are not well understood. In the civilian population, racial/ethnic minorities, women, and sexual orientation minorities have been shown to experience significant behavioral health disparities.[1] However, it is not clear whether similar disparities exist in the military, and this topic has been subject to limited investigation. In addition, scant research has focused on the relationship between sociocultural environmental influences within the military (e.g., discrimination and harassment, stress exposure, social networks) and the behavioral health status of minority service groups.

The Focus of This Study

Identifying where behavioral health disparities may exist among military minority service groups and the factors that may be associated with observed disparities can assist the U.S. Department of Defense (DoD) in better targeting its efforts to address the behavioral health needs of the troops and improve force readiness. To understand whether minority group service members might be at elevated risk of behavioral health problems in the military, we set out to answer two questions:

1. Are minority group service members more likely to experience behavioral health problems relative to their majority counterparts in the military? If so, are these differences still apparent after accounting for individual-level sociocultural environmental factors (e.g., age and education) and interpersonal-level sociocultural environmental factors (e.g., social support and sexual harassment)?

[1] In this report, *sexual orientation minority* status refers chiefly to lesbian, gay, and bisexual individuals. Though much of the existing literature includes other statuses in this group (e.g., gender identity or transgender), we do not include them here given the small sample size in some of the data sets we use. If other groups are included (e.g., when describing the existing literature), we will note that in the text.

2. Do minority groups in the military experience similar or different behavioral health disparities compared with sociodemographically matched minority groups in the civilian population?

To address these questions, we used data from the 2015 Health Related Behaviors Survey (HRBS), which employs a representative sample of active duty service members; the 2015 National Survey on Drug Use and Health (NSDUH); the 2015 and 2016 Behavioral Risk Factor Surveillance System (BRFSS); and the 2015 National Health and Nutrition Examination Survey (NHANES), a nationally representative survey of U.S. adults.

The study focused on mental health and substance use outcomes, as these are two major health and health behavior areas that pose a threat to both individual and force readiness. Mental health outcomes included depression, suicidal behavior (i.e., ideation and attempt), and PTSD. Substance use outcomes included problematic alcohol use (i.e., hazardous and binge drinking) and tobacco use. When seeking to explain any existing minority group differences, the study used the National Institute on Minority Health and Health Disparities (NIMHD) Framework as a guide (see Table S.1), focusing on the sociocultural environmental domains of influence, which include individual-level factors (e.g., sociodemographics such as age and education) and interpersonal-level factors (e.g., social support and sexual harassment). A number of these factors are readily available in existing population-level surveys in both the military and the civilian population, facilitating comparison between the two.

Existing Literature on Behavioral Health Disparities

Existing research has documented significant behavioral health disparities—that is, differences in behavioral health such as prevalence, morbidity, access to care, and treatment outcomes that adversely affect groups who systematically experience greater social or economic barriers to behavioral health based on their race/ethnicity, gender, or social orientation. Among racial/ethnic minorities, the pattern of disparities varies across groups and type of behavioral health condition. For depressive disorders and suicide behaviors, racial/ethnic minority disparities are primarily observed among adolescent and young adult populations. In contrast, when it comes to substance use outcomes (i.e., problematic alcohol and tobacco use), racial/ethnic minorities fare better than their nonminority peers—suggesting that there is a reverse disparity, although more recent data indicate that alcohol misuse may be on the rise for racial/ethnic minority groups. Explanations for racial/ethnic group differences in behavioral health outcomes include stress and trauma exposure, racial/ethnic discrimination, and racial/ethnic specific culture surrounding substance use.

Regarding gender, women are more likely than men to suffer from depression and PTSD. They are also more likely to experience suicidal ideation and suicide attempt, but men are more likely to die by suicide. Men, however, are more likely to abuse alcohol and use tobacco products, including cigarettes and smokeless tobacco. Research on gender differences in use of e-cigarettes is relatively recent and mixed. Explanations for gender differences in behavioral health outcomes include stress exposure and reactivity, mental health problems (with respect to risk of suicidal behavior), biology, and social and contextual factors.

Though the research on sexual orientation is not as well developed due to data limitations, the existing body of work is consistent: individuals who identify as lesbian, gay, or

Table S.1
The National Institute on Minority Health and Health Disparities Framework

Domains of Influence	Levels of Influence			
	Individual	**Interpersonal**	**Community**	**Societal**
Biological	Biological vulnerability and mechanisms	Caregiver-child interaction Family microbiome	Community illness exposure Herd immunity	Sanitation Immunization Pathogen exposure
Behavioral	Health behaviors Coping strategies	Family functioning School/work functioning	Community functioning	Policies and laws
Physical/Built Environment	Personal environment	Household environment School/work environment	Community environment Community resources	Societal structure
Sociocultural Environment	Sociodemographics Limited English Cultural identity Response to discrimination	Social networks Family/peer norms Interpersonal discrimination	Community norms Local structural discrimination	Social norms Societal structural discrimination
Health Care System	Insurance coverage Health literacy Treatment preferences	Patient-clinician relationship Medical decision-making	Availability of health services Safety net services	Quality of care Health care policies
Health Outcomes	**Individual Health**	**Family/ Organizational Health**	**Community Health**	**Population Health**

SOURCE: NIMHD, 2018.
NOTES: Health Disparity Populations: race/ethnicity, low socioeconomic status, rural residence, sexual/gender minority. Other Fundamental Characteristics: sex/gender, disability, geographic region.

bisexual are more likely both to suffer from mental health problems and to use and abuse substances. The Minority Stress Model has been used to explain sexual orientation disparities in behavioral health outcomes and focuses on unique social stressors experienced by sexual orientation minorities. Substance use, in particular, may be a coping mechanism used to address this stress.

Far less research has been completed on military populations, leaving open the question of whether these minority group differences (both disparities and reverse disparities) are also found among service members and whether the same explanatory factors are at play. It is also not clear whether minority group differences observed in the civilian population would remain if civilians mirrored the military population in terms of sociodemographic characteristics. This is an important distinction, because many of the sociodemographic correlates of mental health

problems and substance abuse issues vary dramatically across the two populations (e.g., age, education, and employment status). Thus, to truly understand if there are similarities or differences in minority group disparities between civilians and members of the military, the optimal comparison would involve controlling for these differences to the extent possible.

Military Minority-Majority Group Differences in Behavioral Health

To understand behavioral health disparities in the military, we first used a representative survey of active duty service members' health and health behaviors to examine minority group differences in a set of mental health and substance use outcomes. We also assessed the explanatory power of many of the factors that have been used in civilian research to explain minority-majority differences, all of which are contained in the NIMHD Framework.

Findings indicate that minority group service members experience significant behavioral health disparities relative to their majority group counterparts (i.e., racial/ethnic minority vs. white, female vs. male, and lesbian/gay/bisexual vs. heterosexual). However, we found no systematic pattern of minority group differences across the set of outcomes we examined. For example, only some of the racial/ethnic minority groups experienced disparities, and only on a few of the behavioral health outcomes. Nonetheless, several trends are worthy of note.

There are a number of reverse disparities in the military—where racial/ethnic minority groups have a lower prevalence of behavioral health risks relative to their majority peers. For example, among non-Hispanic blacks, we found a reverse disparity for prevalence of suicidal ideation, hazardous drinking, binge drinking, current cigarette use, daily cigarette use, and smokeless tobacco use. Non-Hispanic blacks report engaging in these behaviors significantly *less* than their non-Hispanic white peers, and we were unable to explain these reverse disparities with the sociocultural environmental factors that were included in our models. We found similar reverse disparities for Hispanics and non-Hispanic Asians compared with non-Hispanic whites. Only a few racial/ethnic disparities were revealed. Risk for suicide attempt was greater among non-Hispanic black and non-Hispanic Asian service members compared with non-Hispanic whites, even after controlling for a host of sociocultural environmental factors. Though the precision of these estimates may have been limited given the low incidence of suicide attempts.

For gender, we found disparities that are consistent with the civilian literature: women report greater levels of mental health problems (i.e., probable depression, suicide behaviors) and men report greater alcohol abuse and tobacco use.

With a few exceptions (i.e., suicidal ideation, suicide attempt, and current cigarette smoking), these gender differences persisted as we varied the explanatory factors (i.e., minority status, individual characteristics, military experiences, and stressors and risk factors) in our models. We did find that gender disparities in suicidal ideation and suicide attempt were no longer significant when other minority characteristics (i.e., race/ethnicity and sexual orientation) were accounted for. Thus, it is unclear whether the gender disparities in suicidal behavior can be attributed to gender, to race/ethnicity, or to sexual orientation.

We found that sexual orientation service members experience the most disparities across the set of behavioral health outcomes examined in this study relative to their heterosexual peers in the military. Gay/lesbian service members report higher levels of suicidal ideation, alcohol misuse (i.e., hazardous drinking, binge drinking), current smoking, and daily smoking com-

pared to heterosexual service members. However, higher likelihood of daily smoking was the only disparity that remained after accounting for sociocultural environmental risk factors.

Bisexual service members report higher levels of all three mental health conditions (i.e., probable generalized anxiety disorder, depression, or PTSD), and most of the substance use problems (i.e., hazardous drinking, current/daily smoking, e-cigarette use) relative to heterosexual service members. However, after accounting for sociocultural environmental stressors and risk factors, only the e-cigarette use disparity persisted.

Military-Civilian Comparisons on Behavioral Health Outcomes

In the next part of our study, we used the same military data and four different nationally representative data sets to match service members and civilians on a set of sociodemographic characteristics, allowing us to make an "apples-to-apples" comparison of minority group differences on a set of behavioral health outcomes across these two populations.

When compared with sociodemographically matched civilians, the U.S. military population overall is characterized by a greater prevalence of mental health problems (i.e., probable depression, suicidal behavior), but lower levels of substance use (i.e., alcohol, tobacco) except for smokeless tobacco. There is limited evidence that racial/ethnic minority groups in the military are faring worse than their civilian counterparts, relative to their majority peers.

There are a few exceptions. In comparison with their white counterparts, racial/ethnic minority groups in the military are more likely to experience a suicide attempt (non-Hispanic blacks and Hispanics), heavy drinking[2] (among individuals identifying as "other race"), and current smoking (Hispanics and non-Hispanic Asians) compared with matched minority groups in the civilian population. There are a few instances in which racial/ethnic minority groups in the military fared better relative to their civilian peers in terms of disparities: for example, "other race" service members have a relatively lower likelihood of suicide attempt and current smoking, and non-Hispanic black service members have a lower likelihood of binge drinking.

Gender disparities in the civilian world are mirrored in the military. Sexual minority groups both in the military and in the civilian population are less likely to use smokeless tobacco, although this protective effect is greater in the civilian population. Sexual orientation minority disparities in rates of heavy drinking are greater among those in the military than in the civilian population.

Taken together, the results suggest that minority group differences in the behavioral health outcomes examined in this study are no different in the military context than they are in the civilian world. Though we did find a small number of differences, largely associated with race/ethnicity, there was no clear pattern by subgroup.

Policy Implications

Based on the results presented in this report, we offer three potential areas for DoD to address in the future. These policy implications are designed to aid DoD in further supporting the behavioral health of minority group service members.

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[2] Four or more binge drinking episodes in the past 30 days

Though there do not appear to be widespread behavioral health disparities among racial/ethnic minority service members, suicide attempt (as self-reported in the HRBS) may be an area of concern that warrants further exploration, particularly for non-Hispanic black, Hispanic, and non-Hispanic Asian military personnel. These minority groups were significantly more likely to have reported a suicide attempt in the past 12 months than were their non-Hispanic white peers. Perceived racism and discrimination, family conflict, and alienation have been identified in the civilian literature as risk factors for suicide attempt among racial/ethnic minority groups. Understanding whether these risk factors identified in civilian populations as well as other military-specific factors (e.g., unit cohesion, leadership support, social network structure) also contribute to the observed racial/ethnic minority disparities in suicide attempt among military personnel would enable DoD to potentially better target suicide prevention efforts directed at these at-risk groups.

Nonetheless, this study's findings should be considered in light of certain study limitations. The low prevalence of suicide attempts and relatively small sample sizes (particularly with respect to the sexual orientation minority groups) may have impacted the precision of the point estimates. The true minority-majority group differences on suicide attempts could actually be smaller or larger. Estimates were derived from a single administration of the 2015 HRBS. Subsequent study is warranted to assess whether this study's findings are replicated in future administrations of the HRBS and other data sources such as the DoD Suicide Event Report System.

To support the behavioral health of female service members, efforts targeting mental health problems versus substance use problems are most needed to address gender disparities within the military. Consistent with prior studies, our findings indicate that female service members are more likely to experience mental health conditions (e.g., depression and suicide attempt) and less likely to engage in problematic alcohol or tobacco use. Although the constellation of factors thought to contribute to gender disparities in the prevalence in mental health problems are complex, recent studies indicate that female service members may disproportionately experience risk factors such as sexual harassment, gender-based discrimination, and low unit cohesion that are linked to their differential odds of experiencing mental health problems. Further study is needed to increase DoD's knowledge of the factors that are connected to gender disparities in mental health, and of those, which are within DoD's purview to act on and intervene.

Sexual orientation minority groups in the military appear to experience significant behavioral health disparities across multiple areas, and may benefit from targeted intervention. Certain sexual minority disparities (i.e., bisexual service members' greater likelihood of reporting probable depression, suicide behaviors, and current smoking; gay/lesbian service members' greater likelihood of reporting current smoking), however, were no longer significant when sociocultural environmental risk factors such as military experiences (e.g., pay grade, deployment length) and stressors (e.g., number of combat exposures, social support, physical abused, unwanted sexual abuse, financial stress) were accounted for. This suggests potential areas DoD could target to reduce sexual minority disparities. However, other sexual minority disparities (i.e., bisexual service members' greater likelihood of e-cigarette use, gay/lesbian service members' greater likelihood of daily smoking) persisted even when accounting for sociocultural environmental risk factors. Moreover, the military-matched civilian comparisons revealed instances in which sexual orientation minorities in the civilian population reported comparable or lower levels of alcohol and tobacco use, relative to their heterosexual peers.

However, this was not the case for sexual minority groups in the military for whom the lower prevalence for these outcomes observed in the civilian population was diminished or no longer evident. Additional study is warranted to assess whether stressors such as stigma, prejudice, and discrimination may account for unexplained sexual orientation disparities.

Conclusion

To better understand the behavioral health needs of minority groups in the services, this report surveys areas in which significant differences in the prevalence of mental health and substance use problems exist and where efforts may be targeted. However, it is equally as important to remember that even when higher levels of certain behavioral health conditions are found among minority (disparities) and majority (reverse disparities) service members, this is not automatically indicative of decreased performance or that the disparity group (whether majority or minority) are somehow unfit for serving in our nation's military.

Prevention programs and behavioral health care treatments that address the broad spectrum of needs represented in today's military will ensure optimal readiness for the men and women who are called upon to serve.

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Finally, we thank the many service members who took the time to complete the survey.

Abbreviations

ACE	adverse childhood experience
AUDIT-C	Alcohol Use Disorders Identification Test-Concise
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CI	confidence interval
HRBS	Health Related Behaviors Survey
LGB	lesbian, gay, and bisexual
MDD	major depressive disorder
NHANES	National Health and Nutrition Examination Survey
NIMHD	National Institute on Minority Health and Health Disparities
NSDUH	National Survey on Drug Use and Health
OR	odds ratio
PROMIS	Patient-Reported Outcomes Measurement Information System
PTSD	posttraumatic stress disorder
REF	reference category

CHAPTER ONE

Introduction

Background

The composition of the U.S. military has grown increasingly diverse since the all-volunteer force was instituted in 1973 (Office of the Under Secretary of Defense, Personnel and Readiness, 2018). As of 2017, racial minorities made up 31 percent of active component enlisted personnel—exceeding their representation, at 24 percent, in the civilian labor force. In 2017, Hispanic service members represented nearly 17 percent of the enlisted force,[1] while women made up 16 percent of the enlisted force—an all-time high in the history of the armed forces. Before the policy known as Don't Ask Don't Tell was lifted in 2011, the RAND Corporation estimated that 2.2 percent of men in the military identified as gay and that 10.7 percent of women identified as lesbian (Rostker et al., 1993). Starting in 2011, lesbian, gay, and bisexual (LGB) service members were eligible to serve openly in the military, which may have facilitated an increase in the representation of sexual orientation minorities within the enlisted force. The 2015 Health Related Behaviors Survey (HRBS) provided the first direct estimates of service personnel who identify as sexual minorities, indicating that approximately 4 percent of male service members identified as gay, bisexual, or transgender compared with 17 percent of female service members identifying as lesbian, bisexual, or transgender (Meadows et al., 2018). The same survey found that 5.8 percent of all service members identified as lesbian, gay, or bisexual.[2]

Whereas the U.S. military has recognized the behavioral health needs of service members in general, the specific needs of these minority groups are not well understood (Institute of Medicine, 2013; Institute of Medicine, 2014). In the civilian sector, significant health disparities have been extensively documented (Institute of Medicine (US), 2003). The National Institute of Minority Health and Health Disparities (NIMHD) defines a health disparity as "a health difference, on the basis of one or more health outcomes, that adversely affects disadvantaged populations" (Alvidrez et al., 2019). A health disparity population is "characterized by a pattern of poorer health outcomes, indicated by the overall rate of disease incidence, prevalence, morbidity, mortality, or survival in the population as compared with the

[1] The Office of Management and Budget requires federal agencies to report race and ethnicity separately and to employ a minimum of five racial categories (white, black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander).

[2] In this report, *sexual orientation minority status* refers chiefly to LGB individuals. Though much of the existing literature includes others in this group (e.g., gender identity or transgender), we do not include them here given the small sample size in some of the data sets we use. If others are included (e.g., when describing the existing literature), we will note that in the text.

general population" (Alvidrez et al., 2019). NIMHD has designated the following as health disparity populations: racial/ethnic minorities, socioeconomically disadvantaged populations, underserved rural populations, and sexual and gender minorities (which includes lesbian, gay, bisexual, transgender, and gender-nonbinary or gender-nonconforming individuals) (Alvidrez et al., 2019).

NIMHD developed a framework to conceptualize and guide understanding of factors related to the promotion of minority health and the reduction of health disparities (Alvidrez et al., 2019). According to the framework, minority health and health disparities are determined by five domains of influence: biological, behavioral, physical/built environment, sociocultural environment, and health care system. Within each of these domains there are four levels of influences: individual, interpersonal, community, and societal. Altogether, this yields a set of 20 determinants that may be pertinent to any given minority health outcome or disparity. Examples of each determinant are provided in Table 1.1. Health outcomes are conceptualized not only at the individual level but at the collective levels (e.g., prevalence of behavioral health conditions within an organization, community, or state). This framework illustrates the vast number of factors that can foster or impede minority health or that cause, maintain, or decrease health disparities.

Although women are not considered a disparity population, NIMHD recognizes that sex or gender (biological or self-identification as male or female) is a fundamental characteristic that should be accounted for when examining health determinants and outcomes. Within the military, however, women or female service do constitute a minority and may be subject to the kinds of stressful life events that can be incurred by those who belong to a minority or stigmatized social group (Frost, 2011; Meyer, 2003). Such stressful life events include being targeted because of a stigmatized identity or status (e.g., race/ethnicity, gender, or sexual orientation) and may be either discrete occurrences (e.g., hate crimes) or chronic episodes (e.g., bullying). Minority or stigmatized social groups can also be subject to lower grades of chronic stress, known as everyday discrimination, which refers to the routine experience of unfair treatment, such as being harassed or threatened, treated with less respect or courtesy than others, or viewed as less capable or intelligent (Todorova et al., 2010; Williams et al., 1997; Williams, Neighbors, and Jackson, 2003). These types of "minority" or "stigma-related" stress have been linked to a host of negative mental health consequences among racial/ethnic minority groups, women, and sexual and gender minorities in the civilian population (Fischer and Holz, 2007; Meyer and Frost, 2013; Mays and Cochran, 2001; Moradi and Subich, 2004; Paradies, 2006).

Among military populations, very limited research has examined whether minority service groups (i.e., racial/ethnic minorities, women, and sexual orientation minorities) are more likely to experience behavioral health problems than their majority group peers. On the one hand, certain domains of influence that have been connected to minority health disparities in the civilian population may not be relevant within the military context. For example, influences under the domains of the physical/built environment (e.g., personal environment, housing, community resources, military policies on substance use) and the health care system (e.g., insurance coverage, medical decisionmaking, availability of services, quality of care) may be more uniform and equitable across minority and majority groups within the military compared with the civilian population. In fact, a comprehensive review conducted by the Institute of Medicine concluded that health care disparities were widespread in the civilian health care system but not as pronounced in the Military Health System (Institute of Medicine, 2003).

Table 1.1
The National Institute on Minority Health and Health Disparities Framework

Domains of Influence	Levels of Influence			
	Individual	**Interpersonal**	**Community**	**Societal**
Biological	Biological vulnerability and mechanisms	Caregiver-child interaction Family microbiome	Community illness exposure Herd immunity	Sanitation Immunization Pathogen exposure
Behavioral	Health behaviors Coping strategies	Family functioning School/work functioning	Community functioning	Policies and laws
Physical/Built Environment	Personal environment	Household environment School/work environment	Community environment Community resources	Societal structure
Sociocultural Environment	Sociodemographics Limited English Cultural identity Response to discrimination	Social networks Family/peer norms Interpersonal discrimination	Community norms Local structural discrimination	Social norms Societal structural discrimination
Health Care System	Insurance coverage Health literacy Treatment preferences	Patient-clinician relationship Medical decision-making	Availability of health services Safety net services	Quality of care Health care policies
Health Outcomes	**Individual Health**	**Family/ Organizational Health**	**Community Health**	**Population Health**

SOURCE: NIMHD, 2018.
NOTES: Health Disparity Populations: race/ethnicity, low socioeconomic status, rural residence, sexual/gender minority. Other Fundamental Characteristics: sex/gender, disability, geographic region.

On the other hand, minority group service members may enter the military with the residual effects of biological influence (e.g., biological mechanisms, caregiver-child interaction) and behavioral influences (e.g., coping strategies, family functioning) that have been tied to health disparities.

Scant research has focused on the relationship between sociocultural environmental influences within the military and the behavioral health status of minority service groups. A small number of studies conducted with Vietnam veterans suggest that sociocultural environmental influences such as race-based discrimination and social networks contributed to racial/ethnic minority veterans' risk of behavioral health problems (Harada et al., 2005; Kulka et al., 1990; Loo, Fairbank, and Chemtob, 2005; Pole, Gone, and Kulkarni, 2008; Ruef, Litz, and Schlenger, 2000). For example, in a study with Asian American Vietnam veterans (Loo, Fair-

bank, and Chemtob, 2005), 77 percent reported experiencing at least one adverse race-related event during their military service, which was associated with an elevated risk of posttraumatic stress disorder (PTSD). In the National Vietnam Veterans Readjustment Study, Latino veterans reported lower levels of social support and unit cohesion, which may have been connected to their greater vulnerability to developing PTSD (Ruef, Litz, and Schlenger, 2000). More recent studies conducted with active duty service members indicate that racial/ethnic minority, female, and sexual orientation minority military personnel continue to experience adverse events related to their minority statuses—for example, discrimination and harassment (Burk and Espinoza, 2012; Gurung et al., 2018; Morral, Gore, and Schell, 2018).

With multiple and protracted deployments to support combat operations in Afghanistan and Iraq during the years following the September 11, 2001, terrorist attacks, a psychological toll has been exacted on service members, as evidenced by their high rates of behavioral health conditions such as PTSD, depression, suicide, and alcohol and other substance use problems (Armed Forces Health Surveillance Center, 2012; Hoge, Auchterlonie, and Milliken, 2006; Nock et al., 2014; Tanielian and Jaycox, 2008). Identifying where behavioral health disparities may exist among military minority service groups and the factors that may be associated with observed disparities can assist DoD in better targeting its efforts to address the behavioral health needs of its troops and improve force readiness. Moreover, it is unknown whether the same pattern of behavioral health disparities found in the civilian population exists in the military population. If minority group disparities are greater in the military population, this might signal the presence of sociocultural environmental influences specific to the military context that may exacerbate minority service group risk of behavioral health conditions.

Key Aims of This Study

To improve DoD's understanding of the behavioral health needs of service members who are racial/ethnic, gender, or sexual orientation minorities, the sponsor of this study, the Psychological Health Center of Excellence, asked RAND to examine minority group differences in the military by race/ethnicity, gender, and sexual orientation. In this study, the following race/ethnicity categories were employed: non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic Asian, other single race (e.g., American Indian/Alaska Native, Native Hawaiian/other Pacific Islander, other), and multiple races. For gender, we employed the terms female and male, given that the survey data used in this study asked respondents to self-report their gender. Instead of employing the term "sexual minority" as used in the literature (Alvidrez et al., 2019; Institute of Medicine, 2011), we used the term "sexual orientation" minority to mainly refer to lesbian, gay, and bisexual individuals given that we did not include other sexual and gender minority statuses (e.g., transgender, gender-nonbinary, or gender-nonconforming) because of small sample sizes in some of the data sets we use. When reviewing the existing literature, we will note in the text if other groups are included and will use the terms employed by cited studies.

Given that the military is a demographically unique population, to truly understand if there are similarities or differences in minority group disparities across the military and civilian populations the optimal comparison would involve controlling for these differences to the extent possible. As such, this study had two major aims:

1. To assess whether minority service groups experience disparities in the prevalence of a variety of behavioral health conditions and whether observed minority group differences are attenuated by sociocultural environmental influences within the military.
2. To compare minority-majority group differences in the prevalence of behavioral health conditions within DoD to representative sociodemographically matched civilian counterparts. For example, are differences in behavioral health outcomes between Hispanic and non-Hispanic white active duty service members similar to sociodemographically matched Hispanic and non-Hispanic whites in the civilian population?

We hypothesize that the minority group disparities observed in the civilian population are likely to be evident, but attenuated, in the military population. Existing behavioral health disparities are likely to follow individuals as they enter the military but then some of the factors underlying and maintaining these disparities (e.g., inadequate access to care) may be mitigated by the military environment.

The study focuses on mental health and substance use outcomes, as these are two major health and health behavior areas that pose a threat to both individual and force readiness. Further, when seeking to explain any existing minority group differences that may emerge, the study used the NIMHD Framework as a guide, focusing on factors in the sociocultural environmental domains of influence.[3] Some of these factors within the sociocultural environmental domain are specific to the military context (e.g., recent deployments and combat trauma exposure). Nonetheless, a number of these factors are readily available in existing population-level surveys in both the military and the civilian population, facilitating comparison between the two.

The Organization of This Report

The remainder of this report consists of four chapters and two appendixes. In Chapter Two, we review the literature on the prevalence of behavioral health conditions across race/ethnicity, gender, and sexual orientation within the general U.S. and military populations, highlighting explanatory factors that have been linked to minority group differences. Chapter Three contains findings related to military minority group differences in behavioral health outcomes and associated explanatory factors. Chapter Four presents comparisons across behavioral health outcomes between sociodemographically matched civilian samples and the U.S. military population. Chapter Five concludes with a summary of the main findings and recommendations for addressing the behavioral health needs of minority groups in the U.S. military. Appendix A presents details about the methodology used in the analyses in Chapters Three and Four, and Appendix B presents the results of a supplementary analysis examining mental health service utilization outcomes.

[3] Though the other domains may be equally as important (i.e., the biological, physical/built environment, and health care system domains) for explaining minority group disparities in health outcomes, they are much more difficult to measure, as they are not as readily available in existing survey data. Further, the health care system is far less variable in the military than it is for the civilian population, as all active duty service members have access to the Military Health System. In Appendix B we do examine minority group disparities in actual use of mental health care, as well as perceived career-related stigma related to the use of such care. Thus, we treat the health care system domain as more of an outcome rather than an explanatory factor.

CHAPTER TWO

Literature Review: Minority Group Differences in Behavioral Health Outcomes

This chapter summarizes the evidence documenting racial/ethnic, gender, and sexual orientation differences in mental health and substance use and highlights the explanatory factors that have been linked to minority group disparities. In discussing minority differences, we first describe the research on civilians, followed by research in the military. For mental health, we consider research on depression, PTSD, suicidal ideation, and suicide attempt, while, for substance use, we focus mainly on alcohol and tobacco use. Evidence on minority behavioral health disparities among civilians was mostly derived from surveys using nationally representative samples. However, few representative data sets are available to describe disparities in the military. Thus, many of the studies included in this review rely on convenience samples of active duty service members or veterans who were receiving mental health or substance use treatment. As a result, the estimates of variations in the military population derived from these studies may be biased.

The chapter also reviews explanations for racial/ethnic, gender, and sexual orientation differences in behavioral health outcomes found in the literature. Much of this literature suggests that heightened levels of stress associated with minority status is a major factor in explaining minority group behavioral health differences. As a result of this stress, minorities are more likely to report psychological distress, which can lead to mental health problems and substance use.

Note that the review is not intended to be exhaustive, but rather to provide a high-level overview of where minority group differences exist and what factors have been used to explain them. Because there are so many difference comparisons to make (e.g., every racial/ethnic minority group versus non-Hispanic whites, women versus men, and multiple sexual minority groups versus heterosexuals) we focus on overall trends. We note where the literature is inconsistent on specific minority groups.

Racial/Ethnic Minorities and Behavioral Health

Racial/Ethnic Minority Behavioral Health in the U.S. Population

In an effort to understand racial/ethnic disparities in mental health, the National Institute of Mental Health funded the Collaborative Psychiatric Epidemiology Studies, three nationally representative surveys that used a common set of measures to enable comparisons among black, Hispanic, Asian, and white racial/ethnic groups[1] (Heeringa et al., 2004). These surveys—the

[1] When reviewing the literature, we will refer to the racial/ethnic categories employed by the study. For example, many studies do not separately report race and ethnicity (e.g., blacks, Asians).

National Comorbidity Survey–Replication, the National Latino and Asian American Study, and the National Survey of American Life—provide much of the current knowledge regarding the prevalence of major depressive disorder (MDD), PTSD, and suicidal behavior across racial/ethnic minority groups. Information regarding the prevalence of alcohol and tobacco use among racial/ethnic minority groups has been largely derived from two national representative surveys, the National Survey on Drug Use and Health (NSDUH) and the National Epidemiologic Survey on Alcohol and Related Conditions (Grant et al., 2015; Substance Abuse and Mental Health Services Administration, 2019).

Mental Health

In general, the prevalence of mental disorders among racial/ethnic minority groups has been shown to be comparable with or lower than that for majority group whites; however, there are some exceptions, which are noted when relevant to the present study. Though there do not appear to be disparities with respect to higher rates of mental disorders among racial/ethnic minority groups, there is some evidence that certain subgroups may experience disparities in terms of more persistent, severe, and disabling courses of mental illness (McGuire and Miranda, 2008).

For MDD, though lifetime prevalence rates are lower among racial/ethnic minorities (Budhwani, Hearld, and Chavez-Yenter, 2015; McLaughlin et al., 2018), age is an important moderating factor, as racial/ethnic minority adolescents and young adults have reported more depressive symptoms than their non-Hispanic white peers (Allen, McNeely, and Orme, 2016; Erol and Karpyak, 2015).

The pattern of racial/ethnic disparities in suicidal behavior differs by ideation and attempt. Rates of suicidal ideation are lower among racial/ethnic minorities, with the lowest prevalence among Asian Americans, at 9 percent; followed Hispanics (11 percent) and blacks (12 percent); and the highest prevalence among whites, at 16 percent (Borges et al., 2012). Suicide attempt rates are lowest among Asian Americans and highest among Hispanics. As with depression, age may matter for racial/ethnic minority differences in suicidal ideation. Based upon data from the National Longitudinal Study of Adolescent Health, Hispanic and non-Hispanic black young adults (ages 18–26), respectively, reported comparable and lower rates of suicidal ideation than their white counterparts (Lorenzo-Luaces and Phillips, 2014).

For PTSD, Hispanic and non-Hispanic black adults have exhibited greater prevalence and non-Hispanic Asian adults lower prevalence compared with non-Hispanic white adults (Alegría et al., 2013; Asnaani et al., 2010; Himle et al., 2009).

The behavioral health needs of multiracial individuals (i.e., those identifying with two or more racial/ethnic backgrounds) have been subject to less study. Findings based on the 2017 NSDUH suggest the presence of significant disparities, with multiracial adults having the highest rate of past year probable mental disorders among all racial/ethnic groups (Substance Abuse and Mental Health Services Administration, 2019).

Substance Use

In the general U.S. population, there are racial/ethnic group differences in the prevalence of substance use. In national studies, Hispanic adults exhibit rates of alcohol use and binge drinking similar to, and black and Asian adults lower than, whites (Alvarez et al., 2007; Blackwell and Villarroel, 2018; Gilman et al., 2008; Grant et al., 2012; Huang et al., 2006).[2]

[2] Binge drinking is defined as four or more alcoholic drinks for women and five or more alcoholic drinks for men on one occasion.

Rates of hazardous drinking (as measured by the Alcohol Use Disorders Identification Test, or AUDIT-C) and alcohol use disorder remain lower among racial/ethnic minority groups compared with whites (Bradley et al., 2007; Caetano et al., 2010; Frank et al., 2008). However, there are data suggesting that these trends may be changing. High-risk drinking rates (defined as binge drinking on five or more days in the past month) have significantly increased among black, Hispanic, and Asian adults in the United States (Grant et al., 2017).

Smoking behaviors are generally not as prevalent among racial/ethnic minority groups as among whites, though patterns vary by age. Daily smoking rates are highest among non-Hispanic whites compared with other racial/ethnic groups (Weinberger et al., 2019). A recent literature review (Freedman Nelson, and Feldman, 2012) indicated that, among young adults age 18 to 25, Asian/Pacific Islander and black youth have greater odds than whites of initiating smoking at a young age, while whites in college or the military are more likely to initiate or increase their smoking over time. Other studies have also found a crossover effect for smoking, with smoking rates among black adults exceeding those among white adults after approximately age 30 (Whitesell et al., 2012). In national studies examining rates of smoking behaviors among adults ages 20–64, racial/ethnic minorities were more likely to be light smokers when compared with non-Hispanic whites (Trinidad et al., 2011). As smoking behaviors diversify into other routes of administration, such as e-cigarette use, similar patterns emerge, with whites tending to have the highest rates of e-cigarette use (Hartwell et al., 2017). This is consistent with other studies showing that black and Hispanic individuals are less likely to use e-cigarettes than whites (Harlow, Stokes, and Brooks, 2018).

Racial/Ethnic Minority Behavioral Health in the Military Population

Mental Health

Unlike research on civilians, studies examining racial/ethnic differences in behavioral health in the military are much less common, and the evidence for disparities is inconsistent. Some studies find no racial/ethnic differences and others find that certain racial/ethnic subgroups do significantly differ from their non-Hispanic white peers (Bray and Hourani, 2007; Kaczkurkin et al., 2016; Williams et al., 2016). Further, trends also vary by outcome. For example, the 2014 HRBS of a representative sample of active duty service members found no racial/ethnic differences in self-reported probable depression or suicide attempt, but did find that certain minority groups (i.e., black and Asian service members) reported *lower* levels of stress and anxiety than their non-Hispanic white peers (Defense Health Agency, 2015). Yet other studies have found the opposite—namely, that certain minority groups with military experience are more likely to meet criteria for probable depression (Britton et al., 2011), are at higher risk of suicide attempt (Naifeh et al., 2019), and are more likely to suffer from PTSD (Kulka et al., 1990; Schlenger et al., 1992; Sutker et al., 1995; Tanielian and Jaycox, 2008).

Substance Use

The literature is somewhat more consistent on the topic of substance use, with racial/ethnic minorities generally faring better than their non-Hispanic white peers. Data from the 2014 HRBS show that non-Hispanic whites have higher levels of problematic alcohol use, including binge drinking (Defense Health Agency, 2015; see also Bell et al., 2006). No racial/ethnic differences in current cigarette smoking were found in the 2014 HRBS, although the research on tobacco use is inconsistent; data from the Millennium Cohort Study, a longitudinal survey of over 48,000 service members using a randomized stratified sample, found that non-Hispanic

whites were more likely to be both past and current smokers than those who never smoked (Smith et al., 2008). Despite these mixed findings, it does appear that there is a reverse disparity in substance use in the military—that is, racial/ethnic minorities are *less likely* to abuse alcohol and use tobacco products than their white counterparts.

There are several reasons why it is difficult to make sense of this literature. First, some of the earlier studies that examined racial/ethnic disparities in behavioral health in the military did not include controls for basic sociodemographic characteristics (e.g., age and education) and these characteristics are themselves correlated with mental health (Grant et al., 2016; Kessler et al., 2012; Salk et al., 2017; Schuler et al., 2018; Yu and Williams, 1999).

Second, the samples in these studies include everyone from current active duty service members, to reservists, to veterans. These are demographically different groups (e.g., reservists tend to be older), who also have very different military experiences (e.g., exposure to combat trauma). And third, many of the studies rely on convenience samples (e.g., service members currently using mental health care), thus calling into question the representativeness of the findings. More work is needed to understand the patterns of racial/ethnic differences in behavioral health in the military.

Explanations for Racial/Ethnic Differences in Behavioral Health

Psychosocial stressors, such as perceived race-based discrimination, have been hypothesized to explain the racial/ethnic differences in the prevalence of behavioral health problems in the civilian population (see, e.g., Paradies et al., 2015; Pascoe and Smart Richman, 2009; Williams and Mohammed, 2009). However, race-based discrimination is not a panacea for explaining minority group differences in mental health because individuals vary in their response to discrimination and have varying levels of resources to cope with the stress associated with discrimination (Carter, 2007). For example, racial identity, problem-focused coping, and social support have been found to buffer the relationship between race-based discrimination and negative mental health in racial/ethnic minority populations (see, e.g., Gayman et al., 2014; Lee and Ahn, 2011; Mossakowski, 2003; Sellers et al., 2003). Research has also found that lower self-esteem, internalized racism, stereotype threat, and heightened stress response explain the associations between perceived race-based discrimination and negative mental health outcomes (Moradi and Risco, 2006; Pascoe and Smart Richman, 2009; Williams and Mohammed, 2013).

Trauma exposure is another potential explanatory factor explored in the literature for racial/ethnic differences in mental health (McLaughlin et al., 2018; Roberts et al., 2011). Data from the 2004–2005 wave of the National Epidemiologic Survey on Alcohol and Related Conditions indicate that Hispanic and non-Hispanic black adults had higher risk of child maltreatment and witnessing domestic violence than non-Hispanic white adults (Roberts et al., 2011). Using data from the Collaborative Psychiatric Epidemiology Studies, McLaughlin and colleagues (2018) found that non-Hispanic black adults had the highest exposure to organized violence and sexual violence in comparison with non-Hispanic white, Hispanic, and Asian adults. Furthermore, Hispanic adults had the highest exposure to physical violence. Traumatic exposure is a necessary prerequisite for PTSD and is a risk factor for other behavioral health problems.

Several theories have been cited in the literature to help elucidate racial/ethnic differences in substance use. For example, prior studies have found that black individuals report less positive attitudes toward drinking than white individuals (Caetano and Clark, 1999;

Herd, 1997) and that alcohol is less integral to socializing and less frequently consumed with meals among blacks relative to whites (Zapolski et al., 2014). Black individuals are more likely to be religiously affiliated (Chatters et al., 2008), which has been shown to be associated with lower rates of alcohol and substance use (Bowie et al., 2017; Haber, Koenig, and Jacob, 2011).

Finally, we were unable to locate any literature specifically examining explanations for racial/ethnic differences in behavioral health in the military. Thus, it is an open question as to whether the explanatory factors identified in the civilian population (e.g., perceived discrimination, stress, etc.) are also applicable in the military.

Gender and Behavioral Health

Gender and Behavioral Health in the U.S. Population

Mental Health

There are well-established gender differences in the expression of mental health problems in the general population. Most data on these gender differences in mental health come from the National Comorbidity Survey, conducted in the early 1990s and replicated in 2001–2002. Men and women are equally likely to have experienced some type of mental disorder in the past year, with women having roughly the same odds as men of reporting symptoms consistent with a disorder (Kessler, Berglund, et al., 2005). However, there are strong gender differences for certain types of mental health problems, with women at higher risk of mood disorders and anxiety disorders, including PTSD, and men at higher risk of problems like substance abuse and impulse-control disorders (Kessler, 2003; Kessler, Berglund, et al., 2005; Kessler, Chiu, et al., 2005). Specifically, adult lifetime rates of MDD were reported by 22 percent of women and 14 percent of men, and rates of lifetime PTSD were reported by 12 percent of women and 4 percent of men (Kessler et al., 2012). For suicidal behavior, women tend to more frequently attempt suicide, but they also tend to use less lethal means in their attempts than men (Centers for Disease Control and Prevention [CDC], 2019; Goldsmith et al., 2002), making men four times more likely to die by suicide than women (CDC, 2015a; Oquendo et al., 2001).

Substance Use

In the general population, a well-established literature consistently finds that women have significantly lower rates of substance use than men (Ait-Daoud et al., 2017; Erol and Karpyak, 2015). Among 2017 NSDUH respondents, the prevalence of binge drinking in the past month is 31 percent among men, compared with 22 percent of among women (Center for Behavioral Health Statistics and Quality, 2018). Additionally, 22 percent of adult male NSDUH respondents report cigarette smoking in the past month, compared with 17 percent of adult female respondents (Center for Behavioral Health Statistics and Quality, 2018). Notable differences are seen regarding the use of smokeless tobacco: among men, the prevalence of lifetime use is 30 percent, and use in the past month is 6 percent, compared with 5 percent and less than 1 percent, respectively, among women (Center for Behavioral Health Statistics and Quality, 2018). Though research on e-cigarette use lags behind that on traditional cigarette use, one review of gender differences in use of e-cigarettes found that adolescent males consistently have higher use rates than adolescent females, whether use is measured as prior or current (Erol and Karpyak, 2015).

Gender and Behavioral Health in the Military Population

Mental Health

Similar gender differences for mental health have been documented in the military but findings are more mixed. That is, women serving in the U.S. military are more likely to experience high anxiety (23 percent of women, versus 16 percent of men) and high depression (12 percent of women, versus 9 percent of men); Barlas et al., 2013). Similarly, another study found a higher likelihood of severe depression in females, as well as higher likelihood of PTSD following combat trauma (Luxton, Skopp, and Maguen, 2010). In fact, there appears to be a general trend toward women reporting more distress in all of the PTSD symptoms (except hypervigilance) than men in the military (Hourani et al., 2015). A recent meta-analysis of mental disorders in the U.S. military found being female to be a consistent risk factor across studies (Gadermann et al., 2012). However, in two Army population-based samples, no gender differences were found in the prevalence of probable PTSD (Hourani et al., 2016). Further, a review on postdeployment PTSD noted that women had a moderately higher risk than men but this was not consistent across studies and even the most rigorously conducted studies were not designed to test for potential gender differences (Crum-Cianflone and Jacobson, 2014).

In terms of suicidal behavior, as in civilian studies, men in the military are roughly three times more likely than women to die by suicide: the Army Study to Assess Risk and Resilience in Servicemembers examined all regular Army members serving between 2004 and 2009 and found a suicide rate of 6.5 (per 100,000 person-years) for female soldiers compared with 20.4 (per 100,000 person-years) for male soldiers (Schoenbaum et al., 2014). However, women in the military are more likely to *attempt* suicide than men, with another study finding that women account for 24 percent of reported suicide attempt in the military but only 4 percent of suicide deaths (Bush et al., 2013). Among active duty service members, 0.5 percent of men compared with 0.9 percent of women reported a suicide attempt within the past year on the 2014 HRBS (Defense Health Agency, 2015), and women were also at higher risk in a study of activated reserve component personnel (Naifeh et al., 2019).

Substance Use

In general, existing data show that servicewomen are less likely than servicemen to report they engage in problematic alcohol use, including binge drinking and alcohol use disorder (Defense Health Agency, 2015). This gender difference has been found in national survey data from both active and reserve component service members (Eisen et al., 2012), Post-Deployment Health Assessment data from service members deployed to Iraq and Afghanistan (Mustillo et al., 2015), and data from the Military Health System (Wooten et al., 2013).

Similarly, men in the military are more likely to report they use tobacco products, especially cigarettes, than women (Brown et al., 2018; Defense Health Agency, 2015; Ulanday et al., 2017). A limited number of studies have examined military gender differences in smokeless tobacco use or e-cigarette use. The 2014 HRBS found that servicemen are far more likely than servicewomen to report they use smokeless tobacco (18 percent versus 3 percent), and less likely to report use of e-cigarettes (percentages not reported; Defense Health Agency, 2015). A handful of other existing studies on gender differences in use of smokeless tobacco and e-cigarettes are primarily based on service branch–specific surveys. A survey of U.S. Air Force trainees in 2011–2013 found that male airmen were significantly more likely than female airmen to report either occasional or regular use of smokeless tobacco (Linde et al., 2017). A 2015–2016

survey of active duty naval personnel found no gender differences in lifetime or current use of e-cigarettes (Hall et al., 2018), whereas a 2015 survey of active duty service members in an Army infantry division found that current e-cigarette use is nearly twice as high among men compared with women (Chin, Lustik, and Pflipsen, 2018).

Explanations for Gender Differences in Behavioral Health

The existing literature offers four main explanations for gender differences in mental health and substance use: stress exposure and reactivity, mental health problems (risk factor for suicidal behavior), biology, and social and contextual factors.

First, existing theoretical models use stress as an explanatory variable, both in terms of stress exposure and reactivity to stress (Hankin, Mermelstein, and Roesch, 2007), and these models tend to focus on early adolescence, when gender differences in depression typically appear. The most comprehensive model explaining gender differences in depression includes biological, affective, and cognitive differences between men and women (Hyde, Mezulis, and Abramson, 2008). Specifically, this model holds that it is a combination of genetic vulnerability, pubertal hormones, pubertal timing and development (biological factors), temperament (affective factors), negative cognitive style, objectified body consciousness, and rumination (cognitive vulnerabilities) that leads, by multiple pathways, to "depressogenic vulnerability." When coupled with negative life events, this vulnerability can lead to depression. In this model, peer sexual harassment has a prominent role in augmenting some of these vulnerabilities.

For PTSD, the explanation of gender differences is complex, due in part to different types of trauma exposure by gender (Tolin and Foa, 2008). Nonetheless, the theoretical model relies on gender differences in stress exposure and reactivity to explain gender differences in PTSD. Men are slightly more likely to be exposed to a traumatic event but, overall, women are more likely to experience PTSD. However, when looking at specific types of trauma exposure, such as sexual assault and child abuse, the gender difference is attenuated or even reversed (Kessler et al., 1995), and in some subpopulations (e.g., police and military), there does *not* appear to be higher risk of PTSD among women when controlling for level of exposure (Hodgins, Creamer, and Bell, 2001; Pole et al., 2001; Street et al., 2013; Vogt et al., 2011). Other explanatory variables include differences in symptom patterns; differences in cognitive, emotional, and behavioral responses to a potentially traumatic event; neurobiological differences; gender roles; and exposure to different types of social support and stressors (Pineles, Arditte Hall, and Rasmusson, 2017; Street and Dardis, 2018; Tolin and Foa, 2008).

Second, in terms of suicidal ideation and suicide attempts, the most powerful explanatory variable is mental health problems. In a meta-analysis of international studies, many from countries with national health care, a majority (87 percent) of those who died by suicide had been previously diagnosed as having a mental disorder at some point in their lifetime (Arsenault-Lapierre, Kim, and Turecki, 2004). A U.S. study within a health maintenance organization showed lower but still substantial numbers, with 45 percent diagnosed with a mental health problem in the prior year (Ahmedani et al., 2014). However, both disorders more common in women (major depression and borderline personality disorder) and more common in men (substance use disorders) confer risk of suicidal behavior, so this does not necessarily explain the gender difference observed. Research also suggests that psychosocial stress, experience with sexual abuse, poor uptake of mental health services, length of the suicide process, and use of lethal means all differ by gender (Schrijvers, Bollen, and Sabbe, 2012).

Third, biological differences between men and women may contribute, at least in part, to gender differences in rates of alcohol consumption. Biologically, women have more lipids and less water than men, resulting in higher blood alcohol concentrations from the same amount of alcohol consumed, and same drinking time, compared with men (Mumenthaler et al., 1999).

And finally, social and contextual factors, as well as gender and cultural norms related to substance use, may also contribute to gender differences in behavioral health outcomes (see, e.g., Holmila and Raitasalo, 2005). In the context of the military, women may experience unique risk factors for substance use compared with their male counterparts. Based on data from the 2018 Workplace and Gender Relations Survey of Active Duty Members, roughly 24.2 percent of women and 6 percent of men reported they experienced sexual harassment (defined as a sexually hostile workplace environment) and approximately 6 percent of women and 0.7 percent of men reported they experienced a sexual assault in the past 12 months (Breslin et al., 2019). Reports of gender discrimination were equally as disparate, with 16 percent of active duty women and 2 percent of active men reporting gender-based discrimination in the past year. As sexual assault is a risk factor for both mental health problems (e.g., depression and PTSD) and substance use (e.g., alcohol abuse), experiences of sexual assault may uniquely contribute to behavioral health issues among female service members (Langdon et al., 2017). In addition, female service members report higher rates of interpersonal stressors during deployment, including general harassment and low unit support, than male service members (Street et al., 2013). There is a very limited but growing literature on the consequences of sexual assault of male service members, which may be underreported because of stigma (Matthews et al., 2018; Sadler et al., 2018; Wilson, 2018).

Sexual Orientation Minorities and Behavioral Health

Sexual Orientation Minorities and Behavioral Health in the U.S. Population

Mental Health

Research on sexual orientation and gender identity minority differences in mental health has lagged behind other research on minority group disparities largely because of a lack of data. The 2015 NSDUH produced the first nationally representative estimates of behavioral health outcomes for sexual orientation and gender identity minorities (Substance Abuse and Mental Health Services Administration, 2016). We use this data for our subsequent analysis and thus do not present findings here. However, this growing body of work does suggest that LGB individuals are at a disadvantage compared with their heterosexual peers on many mental health and substance use outcomes.[3]

Earlier studies, using less representative data, found a similar pattern. A 2008 systematic review found a twofold increase in suicide attempt, and at least 1.5 times increased risk of depression and anxiety disorders, among LGB people (King et al., 2008). These risks varied somewhat by gender, with lesbian and bisexual women at especially high risk of substance dependence, and gay and bisexual men at especially high risk of suicide attempt. A meta-

[3] We do not include disparities among transgender individuals in our review because they are excluded from subsequent analysis due to small sample size.

analytic review showed elevated risk of suicidal ideation (odds ratio [OR] = 1.96), attempts (OR = 3.18), and attempts requiring medical attention (OR = 4.17) among sexual minority versus heterosexual youth (Marshal et al., 2011). Similarly, a more recent meta-analysis of population-based surveys found that the lifetime prevalence of suicide attempt was nearly three times higher among sexual minority adults compared with heterosexual adults, at 11 percent versus 4 percent, respectively (Hottes et al., 2016).[4]

Substance Use

As with mental health, the NSDUH is the primary data source for examining sexual minority differences in substance use. Because we use it in our later analysis (see Chapter Four), we do not repeat those findings here. However, the larger body of research also suggests that LGB individuals are at a disadvantage compared with their heterosexual peers on many substance use outcomes. These disparities are present at initiation, as sexual minority youth report younger ages of first use than heterosexual youth (Fish et al., 2019; Fish and Baams, 2018; IOM [Institute of Medicine], 2011; Talley et al., 2019), and these disparities persist into adulthood with LGB individuals being more likely to use substances than their heterosexual peers. Specifically, U.S. national survey data indicate that sexual minority adults have higher rates of alcohol use disorder, as well as greater alcohol use disorder severity than their heterosexual peers (Allen, McNeely, and Orme, 2016; Allen and Mowbray, 2016). Additionally, sexual minority adults, particularly sexual minority women, have elevated smoking rates compared with heterosexual adults (Gonzales, Przedworski, and Henning-Smith, 2016; McCabe et al., 2019; Wheldon et al., 2018).

Sexual Orientation Minorities and Behavioral Health in the Military Population

Like the LGB civilian populations, LGB service members are at elevated risk of mental health problems. However, data on active duty service members are very limited, and the only large-scale, representative study is the 2015 HRBS, which we use in our analysis described later in Chapter Three of the report. Most work to date has focused on convenience samples of veterans or veterans in a help-seeking context. For example, LGB veterans were more likely to screen positive for depression and PTSD compared with heterosexual veterans (Cochran et al., 2013).

Similarly, the 2015 HRBS is also the primary source of information about sexual minority differences in substance use. Prior studies of military LGB substance use disparities primarily examine veterans. For example, a study of the 2010 Behavioral Risk Factor Surveillance System (BRFSS) found that current smoking rates were significantly higher among LGB veterans, at 21 percent, versus heterosexual veterans, at 15 percent (Blosnich and Silenzio, 2013). Likewise, rates of current smoking were significantly higher among female sexual minority veterans, at 34 percent, compared with both female heterosexual veterans, at 17 percent, and female sexual minority civilians, at 22 percent (Blosnich, Foynes, and Shipherd, 2013). However, the characteristics of the veterans in these studies may differ substantially from active duty military personnel.

[4] Though our review focuses on studies that rely on nationally representative samples, Hottes et al. (2016) also found that the sexual minority disparity in suicide attempt found in population studies may severely underestimate (i.e., halve) the magnitude of the disparity compared with surveys that use community-based sampling approaches.

Explanations for Sexual Minority Differences in Behavioral Health

The Minority Stress Model builds upon social and psychological theories of stress and coping, social identity, prejudice and discrimination, and intergroup relations to explain LGB disparities in health (Meyer, 2003). The model posits that LGB individuals experience unique social stressors related to their social identity as sexual orientation minorities. These stressors include stigma, prejudice, and discrimination. Meyer (2003) also hypothesized three processes through which these stressors can affect LGB mental health: experience with objective stressors that does not depend on self-identification with a minority status, subjective experience with stigma associated with one's self-identity, and internalization of negative stereotypes and attitudes attributed to one's self-identity.

Although sexual minority stressors are prevalent in LGB populations, research has found evidence to support the importance of other minority stressors on LGB mental health. Data from the 2004–2005 National Epidemiologic Survey on Alcohol and Related Conditions show that LGB adults who had experienced discrimination related to both sexual identity and race/ethnicity in the past year reported a higher risk of mental disorders than those who had experienced no discrimination. In contrast, LGB adults who had experienced *only* sexual identity–related discrimination *did not* report higher rates of mental disorders than those who had experienced no discrimination (Bostwick et al., 2014).

In addition to experiencing prejudice and discrimination, sexual minority individuals are vulnerable to other stressful and traumatic experiences, such as sexual victimization and adverse childhood experiences, or ACEs (Schneeberger et al., 2014). ACEs include physical, sexual, and emotional abuse; neglect; exposure to domestic violence; parental discord; familial mental illness; incarceration; and substance use. Data pooled from three states' BRFSS surveys (BRFSS, 2010) found that LGB adults reported higher risks of experiencing ACEs than heterosexual adults (Andersen and Blosnich, 2013). Using the same data, Blosnich and Andersen (2015) found that ACEs are positively associated with self-rated frequent mental distress in LGB adults after controlling for demographic variables. Aggregated data from the Massachusetts BRFSS for 2001–2008 indicate that LGB adults were more likely to report lifetime sexual victimization than heterosexual adults, while bisexual adults were at higher risk of past-year suicidal ideation than their heterosexual counterparts (Conron, Mimiaga, and Landers, 2010). The degree to which these findings are generalizable to the military population is not known.

Substance use may represent a coping mechanism in response to sexual orientation minority–related psychological distress or minority stress. In addition to directly elevating risk of substance use, minority stress is also linked with higher rates of psychological distress and depression (Hatzenbuehler et al., 2008), which may subsequently contribute to substance use and misuse. Life course factors may also contribute to LGB substance use disparities, as civilian LGB young adults disproportionately experience childhood abuse and homelessness and LGB adults disproportionately experience intimate partner violence (Friedman et al., 2011; Schneeberger et al., 2014), factors that are both associated with substance misuse. Substance misuse may thus facilitate dissociation from pain and psychological distress associated with traumatic events (Dube et al., 2003; Kecojevic et al., 2015).

Heterogeneity in substance use risk among civilian LGB individuals is increasingly being recognized, particularly with regard to gender and sexual identity. Bisexual individuals, particularly bisexual women, appear to be uniquely at risk of numerous substance use behaviors (Cochran et al., 2013; Demant et al., 2017; Schuler et al., 2018). Differential risk of substance

misuse across civilian LGB subgroups may reflect differences in minority stress experiences (Moran, Chen, and Tryon, 2018; Parra et al., 2018) and demographic and life course factors (Krueger and Upchurch, 2019; Schuler et al., 2018) across LGB subgroups. Civilian bisexual individuals are thought to experience additional bisexual-specific stigma and stressors arising from the dominant binary model of sexual orientation (i.e., gay/lesbian versus heterosexual), including skepticism of the very existence of bisexuality, perceptions that bisexuals are confused about their sexual orientation, and bisexual "invisibility"—for example, the assumption that they are either gay/lesbian or heterosexual based on the gender of their partner (Feinstein and Dyar, 2017; Mereish, Katz-Wise, and Woulfe, 2017). These phenomena, which may be amplified among civilian women, may be internalized and contribute to mental distress, social isolation, and substance use risk (Friedman et al., 2014; Katz-Wise, Mereish, and Woulfe, 2017). Additionally, rates of mental health problems, suicidality, interpersonal violence, and sexual assault are also significantly elevated among bisexual civilian women relative to other sexual orientation groups (Ross et al., 2018; Salway et al., 2019; Turell, Brown, and Herrmann, 2018).

Chapter Summary

This chapter has reviewed the existing literature on minority group differences with respect to race/ethnicity, gender, and sexual orientation, focusing on the prevalence of mental health and substance use problems. We summarize the key findings as follows:

- Though a large body of existing research has examined racial/ethnic differences in the prevalence of mental health problems among the civilian population, this literature is far from consistent, especially when it comes to specific racial/ethnic minority subgroups. For depression and suicidal behavior, racial/ethnic minority disparities are primarily observed among adolescent and young adult populations. In contrast, when it comes to substance use (i.e., problematic alcohol and tobacco use), racial/ethnic minorities fare better than their nonminority peers—suggesting that there is a reverse disparity, but more recent data indicate that alcohol misuse may be on the rise for racial/ethnic minority groups. There is more consistent evidence for disparities with respect to racial/ethnic minority groups experiencing a more chronic and severe course of mental illness within the civilian population. There is a paucity of data on this topic with respect to military populations.
- Explanations for racial/ethnic group differences in behavioral health outcomes include stress and trauma exposure, racial/ethnic discrimination, and racial/ethnic specific culture surrounding substance use. There are limited data related to the military population on this topic.
- Regarding gender, there is evidence that rates of depression and PTSD may be elevated among female service members, but findings are equivocal. Female service members appear more likely to experience suicidal ideation and suicide attempts, but male service members are more likely to die by suicide. Males, however, are more likely to abuse alcohol and use tobacco products, including cigarettes and smokeless tobacco. Research on gender differences regarding use of e-cigarettes is relatively recent and mixed.
- Explanations for gender differences in behavioral health outcomes include stress exposure and reactivity, mental health problems, biology, and social and contextual factors.

- Though the research on behavioral health disparities related to sexual orientation is not as well-developed in the military due to data limitations, the existing body of work is consistent with civilian studies: individuals who identify as LGB service members appear more likely than heterosexual service members both to report mental health problems and to report use and abuse of substances.
- The Minority Stress Model has been used to explain sexual orientation disparities in behavioral health prevalence and incidence and focuses on unique social stressors experienced by sexual orientation minorities.

Far less research has been completed on military populations, leaving open the question of whether these minority group differences (both disparities and reverse disparities) are also found among service members. The limited research with military populations reviewed in this chapter suggests that many of these reported minority-majority group differences may hold, though much of this with military populations work has relied on nonrepresentative or older samples. Further, very little work has examined whether the same explanatory factors are at play in the military. It is also not clear whether minority group differences observed in the civilian population would remain if civilians mirrored the military population in terms of sociodemographic characteristics. This is important because many of the sociodemographic correlates of mental health problems and substance abuse issues (e.g., age, education, and employment status) vary dramatically across the two populations. For instance, compared with the civilian population, the military population tends to be younger in age and more predominantly male. Thus, to truly understand if there are similarities or differences in minority group disparities between civilians and members of the military, the optimal comparison would involve controlling for these differences to the extent possible. To date, no existing studies have addressed this.

In the next two chapters we address these missing areas of research. In Chapter Three we use a representative survey of active duty service members' health and health behaviors to examine minority group differences in a set of mental health and substance use outcomes. We also assess the explanatory power of many of the factors that have been used in civilian research to explain minority-majority differences, all of which are contained in the NIMHD Framework described in Chapter One. In Chapter Four we use the same military data and four different nationally representative data sets to match service members and civilians on a set of sociodemographic characteristics, allowing us to make an "apples-to-apples" comparison of minority group differences on a set of behavioral health outcomes across these two populations.

CHAPTER THREE

Factors Related to Military Minority Group Differences in Behavioral Health Outcomes

In this chapter we address the first aim of the study: to assess whether minority service groups experience disparities across a variety of behavioral health conditions and whether observed minority group differences are reduced by sociocultural environmental influences within the military. To do this analysis, we rely on a series of nested, logistic regression models that use data from the 2015 HRBS. More details about the methods, including descriptive tables of the HRBS data, can be found in Appendix A, but briefly, these models are used to assess, first, whether there are minority group differences in a set of mental health and substance use outcomes and, second, if there are differences, whether sociodemographic characteristics, military experiences, and minority group–related stressors can account for the significant differences.

Key mental health outcomes include probable MDD, suicidal ideation, suicide attempt, and probable PTSD. Key substance use outcomes include hazardous drinking, binge drinking, current cigarette smoking, daily cigarette smoking, smokeless tobacco use, and e-cigarette use.

We begin by describing the association between minority status—race/ethnicity, gender, and sexual orientation—and the outcome in question in a bivariate model, with no covariates (Model 1). Starting with Model 2, we sequentially introduced the explanatory factors into a logistic regression model in the following order:

- **Model 2: Minority Membership.** This model includes indicators for all the minority memberships, including race/ethnicity, gender, and sexual orientation, at the same time.
- **Model 3: Individual Characteristics.** In addition to the covariates in Model 2, Model 3 also includes indicators for age, education, marital status, parental status, and service branch.
- **Model 4: Military Experiences.** In addition to the covariates in Model 3, Model 4 includes indicators for pay grade and the time service members spent in deployment in the 12 months prior to the survey.
- **Model 5: Stressors/Risk Factors.** In addition to the covariates in Model 4, Model 5 includes indicators for the lifetime number of combat trauma events experienced by the service members, perceived emotional social support, lifetime experience with physical abuse, lifetime unwanted sexual contact, financial stress, and alcohol norms and beliefs (only in models where an alcohol-related behavior is the outcome).

All analyses use the original weights produced for the 2015 HRBS. Results shown in the tables in this chapter are presented as unadjusted or adjusted ORs and with 95 percent

confidence intervals (CIs) for each of the racial/ethnic, gender, and sexual orientation categories. An OR of 1.00 indicates that the minority group is not more or less likely to report the behavioral health condition relative to the reference majority group; an OR < 1.00 means that the minority group is less likely to report the behavioral condition, and an OR > 1.00 means that the minority group is more likely to report the behavioral health condition. It is also important to keep in mind that small ORs, near 1.00, suggest small substantive differences between groups, even if the OR is statistically significant. Larger ORs, especially those that are over 4.27 or below 0.23 suggest large substantive differences between groups.[1] Finally, it is also worth noting that such large ORs may be substantively important regardless of statistical significance, especially if the size of the minority group is small. Such small samples can affect the power of analyses to detect significant effects.

Full model results (from Model 5) are presented in Table A.1 for mental health outcomes and in Table A.2 for substance use outcomes; results from Models 2–4 are available from the authors.

Mental Health

Probable Major Depressive Disorder

Overall, 9.4 percent of 2015 HRBS survey respondents reported symptoms that met the criteria for probable MDD. Regression results for probable MDD are presented in Table 3.1.

Race/Ethnicity. We found no evidence of a significant difference between racial/ethnic minorities and their non-Hispanic white peers in the percentages of service members who met the criteria for probable MDD.

Gender. In bivariate analyses (Model 1), female service members reported symptoms consistent with a significantly higher likelihood of probable MDD compared with male service members (OR = 1.23; 95 percent CI [1.01, 1.52]), and this significantly elevated OR was also seen in Individual Characteristics (Model 3) and Military Experiences (Model 4); the OR = 1.28 in each model (see Table 3.1 for 95 percent CI). In Stressors/Risk Factors (Model 5), the statistically significant likelihood for women was somewhat larger (OR = 1.46; 95 percent CI [1.08, 1.96]). Even after controlling for the available explanatory variables, female service members remained at higher odds of probable MDD than male service members.

Sexual Orientation. In bivariate analyses (Model 1), bisexual service members reported significantly higher odds of probable MDD compared with heterosexual service members (OR = 2.23; 95 percent CI [1.30, 3.82]). The differences remained significant in Models 2–4 (i.e., Minority Membership, Individual Characteristics, and Military Experiences), but not for Stressors/Risk Factors (Model 5). Once we accounted for stressors and risk factors, the difference in probable MDD between bisexual and heterosexual service members was no longer statistically significant.[2] Across models, the OR decreased by roughly 30 percent, from 2.11 in Minority Membership (Model 2) to 1.41 in Stressors/Risk Factors (Model 5).

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[1] These values correspond to a Cohen's d (effect size) of 0.8. A small effect (d = 0.2) corresponds to an OR of 0.70 or 1.44 (depending on direction) and a medium effect (d = 0.5) corresponds to an OR of 0.40 or 2.48.

[2] The sample size of the HRBS (i.e., small subsample sizes for some minority groups) prevented us from examining which specific factors within each block of model-specific factors accounted for changes in statistical significance and reductions in OR sizes. Results from the final full model can be found in Appendix A.

Table 3.1
Minority Group Differences in Probable Major Depressive Disorder

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.89 (0.60–1.32)	0.83 (0.57–1.23)	0.72 (0.48–1.06)	0.69 (0.46–1.02)	0.75 (0.50–1.14)
Hispanic	1.09 (0.77–1.54)	1.07 (0.76–1.51)	0.92 (0.65–1.32)	0.91 (0.63–1.30)	0.92 (0.62–1.38)
Non-Hispanic Asian	0.88 (0.42–1.87)	0.87 (0.41–1.82)	0.88 (0.41–1.91)	0.79 (0.37–1.69)	0.95 (0.44–2.03)
Other single race	1.64 (0.95–2.82)	1.58 (0.92–2.73)	1.32 (0.76–2.29)	1.28 (0.73–2.26)	1.25 (0.69–2.26)
Multiple races	1.55 (1.00–2.42)	1.49 (0.96–2.32)	1.40 (0.90–2.18)	1.34 (0.86–2.09)	1.10 (0.66–1.82)
Gender					
Male	REF	REF	REF	REF	REF
Female	1.23* (1.01–1.52)	1.16 (0.94–1.43)	1.28* (1.01–1.61)	1.28* (1.01–1.62)	1.46* (1.08–1.96)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	0.93 (0.56–1.54)	0.90 (0.55–1.47)	0.84 (0.49–1.45)	0.84 (0.48–1.47)	0.72 (0.39–1.35)
Bisexual	2.23* (1.30–3.82)	2.11* (1.21–3.66)	1.99* (1.12–3.53)	2.07* (1.16–3.69)	1.41 (0.79–2.53)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds model pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Suicidal Ideation Since Joining the Military

Overall, 12.3 percent of survey respondents indicated thoughts of suicide since joining the military. Regression results for suicidal ideation are presented in Table 3.2.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic black (OR = 0.62; 95 percent CI [0.42, 0.90]) and Hispanic (OR = 0.57; 95 percent CI [0.40, 0.79]) service members reported significantly lower odds for suicidal ideation since joining the military compared with

Table 3.2
Minority Group Differences in Suicidal Ideation Since Joining the Military

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.62* (0.42–0.90)	0.59* (0.41–0.87)	0.50* (0.34–0.74)	0.49* (0.33–0.73)	0.53* (0.35–0.80)
Hispanic	0.57* (0.40–0.79)	0.56* (0.40–0.78)	0.51* (0.37–0.72)	0.51* (0.36–0.71)	0.47* (0.33–0.67)
Non-Hispanic Asian	0.87 (0.47–1.60)	0.87 (0.47–1.60)	0.80 (0.44–1.45)	0.78 (0.42–1.43)	0.90 (0.48–1.69)
Other single race	0.97 (0.57–1.65)	0.97 (0.57–1.66)	0.84 (0.47–1.49)	0.84 (0.48–1.48)	0.75 (0.42–1.35)
Multiple races	1.22 (0.83–1.79)	1.16 (0.80–1.69)	1.15 (0.79–1.68)	1.13 (0.77–1.66)	0.96 (0.62–1.48)
Gender					
Male	REF	REF	REF	REF	REF
Female	1.25* (1.05–1.49)	1.14 (0.94–1.37)	1.17 (0.96–1.43)	1.17 (0.96–1.43)	0.97 (0.76–1.23)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.80* (1.08–2.98)	1.75* (1.05–2.93)	1.72 (0.99–2.97)	1.75* (1.00–3.04)	1.55 (0.87–2.76)
Bisexual	2.41* (1.55–3.73)	2.39* (1.51–3.77)	2.41* (1.51–3.85)	2.36* (1.48–3.77)	1.63 (1.00–2.67)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

non-Hispanic white service members. These remained significant in models that controlled for other demographic and explanatory variables. In Minority Membership (Model 2), non-Hispanic black and Hispanic service members reported significantly lower odds for suicidal ideation (OR = 0.59; 95 percent CI [0.41, 1.60] and OR = 0.56; 95 percent CI [0.40, 0.78], respectively) than their non-Hispanic peers, and this was also the case in both Individual Characteristics (Model 3) and Military Experiences (Model 4). Finally, both non-Hispanic

black and Hispanic service members were statistically less likely to report premilitary suicidal ideation than white service members (OR = 0.53; 95 percent CI [0.35, 0.80] and OR = 0.47; 95 percent CI [0.33, 0.67], respectively) in Stressors/Risk Factors (Model 5).

Gender. In bivariate analyses (Model 1), female service members showed significantly higher likelihood of suicidal ideation compared with male service members (OR = 1.25; 95 percent CI [1.05, 1.49]). However, we did not observe any gender differences in rates of suicidal ideation once controlling for other demographic and personal variables.

Sexual Orientation. In bivariate analyses (Model 1), gay/lesbian and bisexual service members (OR = 1.80; 95 percent CI [1.08, 2.98] and OR = 2.41; 95 percent CI [1.55, 3.73], respectively) were significantly more likely to report suicidal ideation since joining the military than heterosexual service members. The differences remained significant in Minority Membership (2), Individual Characteristics (Model 3), and Military Experiences (Model 4). In Minority Membership (Model 2), gay/lesbian (OR = 1.75; 95 percent CI [1.02, 2.93]) and bisexual (OR = 2.39; 95 percent CI [1.51, 3.77]) service members reported statistically significant higher odds of suicidal ideation compared with their heterosexual counterparts. Similarly, bisexual service members (OR = 2.41; 95 percent CI [1.55, 3.73]) were significantly more likely to report suicidal ideation than heterosexual service members in Individual Characteristics (Model 3). Though the magnitude of the OR for gay/lesbian service members was similar to the previous model, it was not significant in Individual Characteristics (Model 3). In Military Experiences (Model 4), both bisexual service members (OR = 2.36; 95 percent CI [1.48, 3.77]) and gay/lesbian service members (OR = 1.75; 95 percent CI [1.00, 3.04]) reported significantly higher likelihood of suicidal ideation than heterosexual service members. However, once stressors and risk factors were included (Model 5), the significance of the ORs for both gay/lesbian and bisexual service members was attenuated, and the magnitude of the OR was reduced by roughly 10 percent for gay/lesbian service members, from 1.75 in Minority Membership (Model 2) to 1.55 in Stressors/Risk Factors (Model 5) and roughly 30 percent for bisexual service members, from 2.39 in Model 2 to 1.63 in Model 5.

Suicide Attempt Since Joining the Military

Overall, 2.6 percent of survey respondents reported a suicide attempt after joining the military. Regression results for suicidal ideation are presented in Table 3.3.

Race/Ethnicity. Bivariate analyses (Model 1) found that, in comparison with white service members, non-Hispanic Asian and non-Hispanic black service members reported significantly higher likelihood of suicide attempt (OR = 3.79; 95 percent CI [1.57, 9.16] and OR = 2.28; 95 percent CI [1.20, 4.35], respectively). The differences remained significant in models that controlled for demographic and explanatory variables. In Minority Membership (Model 2), controlling for gender and sexual minority status, non-Hispanic Asian and non-Hispanic black service members were more likely to report suicide attempt (OR = 3.84; 95 percent CI [1.57, 9.36] and OR = 2.23; 95 percent CI [1.16, 4.30], respectively) compared with white service members. Non-Hispanic Asian and non-Hispanic black service members reported significantly elevated odds of suicide attempt than white service members in Individual Characteristics (Model 3) model (OR = 4.18; 95 percent CI [1.83, 9.55] and OR = 2.11; 95 percent CI [1.08, 4.15], respectively). In Military Experiences (Model 4), non-Hispanic Asian service members (OR = 3.81; 95 percent CI [1.75, 8.30]) and non-Hispanic black service members (OR = 2.04; 95 percent CI [1.02, 4.09]) were significantly more likely to report suicide attempt than white service members. Finally, both non-Hispanic Asian and non-Hispanic

Table 3.3
Minority Group Differences in Suicide Attempt Since Joining the Military

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	2.28* (1.20–4.35)	2.23* (1.16–4.30)	2.11* (1.08–4.15)	2.04* (1.02–4.09)	2.46* (1.18–5.11)
Hispanic	1.23 (0.63–2.37)	1.24 (0.64–2.40)	1.11 (0.57–2.19)	1.07 (0.55–2.11)	1.12 (0.56–2.24)
Non-Hispanic Asian	3.79* (1.57–9.16)	3.84* (1.57–9.36)	4.18* (1.83–9.55)	3.81* (1.75–8.30)	5.40* (2.53–11.53)
Other single race	1.01 (0.22–4.65)	1.07 (0.23–4.93)	0.94 (0.19–4.65)	0.92 (0.18–4.64)	0.91 (0.17–4.77)
Multiple races	1.46 (0.65–3.28)	1.36 (0.62–2.96)	1.23 (0.56–2.68)	1.16 (0.53–2.55)	1.04 (0.49–2.21)
Gender					
Male	REF	REF	REF	REF	REF
Female	1.46* (1.00–2.12)	1.23 (0.82–1.84)	1.24 (0.78–1.95)	1.25 (0.79–1.98)	1.31 (0.80–2.14)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	2.04 (0.73–5.69)	1.88 (0.64–5.55)	2.08 (0.65–6.60)	2.08 (0.64–6.84)	2.00 (0.63–6.32)
Bisexual	2.78* (1.38–5.60)	2.56* (1.25–5.22)	2.51* (1.18–5.36)	2.48* (1.16–5.29)	1.82 (0.86–3.85)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

black service members were significantly more likely to report a suicide attempt than white service members (OR = 5.40; 95 percent CI [2.53, 11.53] and OR = 2.46; 95 percent CI [1.18, 5.11] respectively) in Stressors/Risk Factors (Model 5). Although all the differences are statistically significant, the CIs associated with these differences are wide, suggesting that the precision of our estimates is low. Suicide attempt is a very low-prevalence outcome and this likely is why the CIs are so wide.

Gender. In bivariate analyses (Model 1), female service members were significantly more likely to report having a suicide attempt since joining the military compared with men (OR = 1.46; 95 percent CI [1.00, 2.12]). However, we did not observe any gender differences in rates of suicide attempt once controlling for other demographic and personal variables.

Sexual Orientation. In bivariate analyses (Model 1), bisexual service members were significantly more likely than heterosexual service members to report a post-enlistment suicide attempt (OR = 2.78; 95 percent CI [1.38, 5.60]). The differences remained significant in Minority Membership (Model 2), Individual Characteristics (Model 3), and Military Experiences (Model 4). In Minority Membership (Model 2), bisexual service members reported significantly higher odds of a suicide attempt than their heterosexual counterparts (OR = 2.56; 95 percent CI [1.25, 5.22]). Similarly, bisexual service members reported significantly higher likelihood of a suicide attempt (OR = 2.51; 95 percent CI [1.18, 5.36]) than heterosexual service members in Individual Characteristics (Model 3). In Military Experiences (Model 4), bisexual service members reported significantly higher likelihood of a suicide attempt than heterosexual service members as well (OR = 2.48; 95 percent CI [1.16, 5.29]). However, once we accounted for stressors and risk factors, the difference in odds of suicide attempt between bisexual and heterosexual service members was no longer statistically significant. Across models, the OR decreased by roughly 30 percent, from 2.56 in Minority Membership (Model 2) to 1.82 in Stressors/Risk Factors (Model 5).

Probable Posttraumatic Stress Disorder

Overall, 8.5 percent of survey respondents met the criteria for probable PTSD. Regression results for probable PTSD are presented in Table 3.4.

Race/Ethnicity. In bivariate analyses (Model 1), service members who identified as belonging to another single-race group did have higher odds of experiencing PTSD (OR = 2.07; 95 percent CI [1.21–3.55]). This association remained significant in Minority Membership (Model 2), but with the addition of individual characteristics (Model 3), the association was no longer statistically significant, as the OR was reduced by roughly 20 percent, from 2.02 in Model 2 to 1.67 in Model 3.

Gender. We did not observe any evidence of significant gender differences in rates of probable PTSD, regardless of the model.

Sexual Orientation. We did not observe any evidence of significant sexual orientation differences in rates of probable PTSD, regardless of the reference category or the model.

Substance Use

Alcohol

Hazardous Drinking

Overall, 35.3 percent of service members reported symptoms to meet the criteria for hazardous drinking in the past year, as measured by AUDIT-C. Regression results for hazardous drinking are presented in Table 3.5.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic Asian (OR = 0.34; 95 percent CI [0.23–0.53]), non-Hispanic black (OR = 0.33; 95 percent CI [0.26–0.43]), Hispanic (OR = 0.71; 95 percent CI [0.58–0.88]), and other single-race (OR = 0.65; 95 percent CI [0.45–0.93]) service members were significantly less likely to report hazardous drinking compared

Table 3.4
Minority Group Differences in Probable Posttraumatic Stress Disorder

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	1.33 (0.91–1.94)	1.29 (0.88–1.88)	1.09 (0.74–1.60)	1.02 (0.69–1.50)	1.45 (0.93–2.25)
Hispanic	1.10 (0.75–1.61)	1.09 (0.75–1.60)	1.00 (0.67–1.49)	0.97 (0.65–1.43)	1.02 (0.65–1.58)
Non-Hispanic Asian	0.70 (0.30–1.64)	0.70 (0.30–1.64)	0.67 (0.28–1.60)	0.59 (0.25–1.41)	0.77 (0.30–1.96)
Other single race	2.07* (1.21–3.55)	2.02* (1.18–3.46)	1.67 (0.95–2.94)	1.62 (0.91–2.90)	1.82 (0.91–3.63)
Multiple races	1.45 (0.89–2.37)	1.41 (0.87–2.28)	1.34 (0.83–2.18)	1.27 (0.78–2.08)	1.05 (0.63–1.75)
Gender					
Male	REF	REF	REF	REF	REF
Female	1.18 (0.95–1.47)	1.12 (0.90–1.40)	1.23 (0.97–1.55)	1.22 (0.96–1.56)	1.27 (0.92–1.77)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	0.92 (0.46–1.83)	0.92 (0.46–1.82)	0.90 (0.44–1.85)	0.90 (0.44–1.87)	0.71 (0.34–1.46)
Bisexual	1.60 (0.97–2.66)	1.48 (0.88–2.48)	1.53 (0.90–2.60)	1.59 (0.93–2.71)	1.00 (0.58–1.73)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

with non-Hispanic white service members. The differences remained significant, and the magnitude of the effects were similar in Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5). Overall, there appears to be lower rates of hazardous drinking among non-Hispanic Asian, non-Hispanic black, Hispanic, and other-race service members when compared with non-Hispanic white service members, even after controlling for available demographic and explanatory variables.

Table 3.5
Minority Group Differences in Hazardous Drinking

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Groups	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.33* (0.26–0.43)	0.33* (0.26–0.43)	0.34* (0.26–0.44)	0.35* (0.27–0.46)	0.39* (0.30–0.50)
Hispanic	0.71* (0.58–0.88)	0.71* (0.57–0.87)	0.66* (0.53–0.81)	0.67* (0.54–0.83)	0.70* (0.57–0.88)
Non-Hispanic Asian	0.35* (0.23–0.53)	0.34* (0.23–0.53)	0.30* (0.20–0.47)	0.33* (0.21–0.52)	0.36* (0.24–0.56)
Other single race	0.65* (0.45–0.93)	0.65* (0.45–0.93)	0.67* (0.46–0.98)	0.69 (0.47–1.02)	0.67* (0.46–0.98)
Multiple races	0.91 (0.69–1.20)	0.92 (0.70–1.22)	0.87 (0.65–1.17)	0.91 (0.68–1.21)	0.86 (0.63–1.16)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.81* (0.72–0.91)	0.80* (0.71–0.90)	0.79* (0.69–0.89)	0.79* (0.69–0.90)	0.78* (0.67–0.91)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.78* (1.18–2.69)	1.94* (1.26–3.00)	1.46 (0.91–2.33)	1.46 (0.91–2.35)	1.33 (0.84–2.09)
Bisexual	1.33 (0.92–1.93)	1.53* (1.03–2.29)	1.46 (0.98–2.18)	1.45 (0.96–2.18)	1.29 (0.86–1.94)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Gender. In bivariate analyses (Model 1), women (OR = 0.81; 95 percent CI [0.72, 0.91]) had significantly lower rates of hazardous drinking compared with men. This difference persisted across Minority Membership (Model 2; OR = 0.80; 95 percent CI [0.71, 0.90]), Individual Characteristics (Model 3; OR = 0.79; 95 percent CI [0.69, 0.89]), Military Experiences (Model 4; OR = 0.79; 95 percent CI [0.69, 0.90]), and Stressors/Risk Factors (Model 5; OR = 0.78; 95 percent CI [0.67, 0.91]).

Sexual Orientation. In bivariate analyses (Model 1), gay/lesbian (OR = 1.78; 95 percent CI [1.18, 2.69]), but not bisexual, service members had significantly elevated odds of hazardous drinking compared with heterosexual service members. In Minority Membership (Model 2), both gay/lesbian (OR = 1.94; 95 percent CI [1.26, 3.00]) and bisexual (OR =1.53; 95 percent CI [1.03, 2.29]) service members had elevated rates of hazardous drinking compared with their heterosexual peers. No differences in rates of hazardous drinking were observed across sexual orientation groups in Individual Characteristics (Model 3), Military Experiences (Model 4), or Stressors/Risk Factors (Model 5). Thus, controlling for a service member's multiple minority memberships (e.g., non-Hispanic black and lesbian, Hispanic and gay) was able to account for the significant association between minority sexual status and higher likelihood of hazardous drinking. However, we note that the size of OR for bisexual service members was largely unchanged across Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5); for gay/lesbian service members the size of the OR did decrease by roughly 30 percent between Models 2 and 5, from 1.94 to 1.33.

Binge Drinking

Overall, 30.0 percent of service members reported binge drinking (as defined by having five or more drinks for men and four or more drinks for women on the same occasion) in the past month. Regression results for binge drinking are presented in Table 3.6.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic Asian and non-Hispanic black service members were significantly less likely to report binge drinking in the past month (OR = 0.56; 95 percent CI [0.37, 0.84] and OR = 0.46; 95 percent CI [0.35, 0.60], respectively) compared with non-Hispanic white service members. The differences between non-Hispanic Asian and non-Hispanic black service members in binge drinking remained significant and similar in magnitude in the other four models that controlled for other demographic and explanatory variables. Overall, there appear to be slightly lower rates of binge drinking among non-Hispanic Asian and non-Hispanic black service members compared with non-Hispanic white service members, even after controlling for available demographic and explanatory variables.

Gender. In bivariate analyses (Model 1), women had significantly lower rates of binge drinking compared with men (OR = 0.66; 95 percent CI [0.58, 0.75]). This difference persisted across Minority Membership (Model 2; OR = 0.64; 95 percent CI [0.56, 0.73]), Individual Characteristics (Model 3; OR = 0.64; 95 percent CI [0.55, 0.73]), Military Experiences (Model 4; OR = 0.64; 95 percent CI [0.55, 0.73]), and Stressors/Risk Factors (Model 5; OR = 0.64; 95 percent CI [0.54, 0.75]).

Sexual Orientation. In bivariate analyses (Model 1), gay/lesbian (OR = 1.78; 95 percent CI [1.17, 2.71]), but not bisexual, service members had significantly elevated odds of binge drinking compared with heterosexual service members. In Minority Membership (Model 2), gay/lesbian (OR = 2.03; 95 percent CI [1.32–3.12]), but not bisexual, service members had elevated rates of binge drinking. No differences in rates of binge drinking were observed across sexual orientation groups in Individual Characteristics (Model 3), Military Experiences (Model 4), or Stressors/Risk Factors (Model 5). Individual characteristics were able to account for the significant difference between gay/lesbian and heterosexual service members. The magnitude of the OR for gay/lesbian service members was reduced by roughly 30 percent between Minority Membership (Model 2) and Individual Characteristics (Model 3), from 2.03 in Model 2 to 1.48 in Model 3.

Table 3.6
Minority Group Differences in Binge Drinking

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.46* (0.35–0.60)	0.47* (0.36–0.61)	0.49* (0.37–0.65)	0.49* (0.37–0.65)	0.54* (0.40–0.72)
Hispanic	0.92 (0.75–1.14)	0.92 (0.74–1.14)	0.86 (0.68–1.08)	0.87 (0.69–1.09)	0.91 (0.72–1.15)
Non-Hispanic Asian	0.56* (0.37–0.84)	0.55* (0.37–0.84)	0.49* (0.32–0.75)	0.51* (0.33–0.79)	0.56* (0.36–0.87)
Other single race	0.84 (0.58–1.23)	0.85 (0.59–1.24)	0.89 (0.58–1.36)	0.90 (0.59–1.38)	0.87 (0.57–1.34)
Multiple races	0.95 (0.71–1.26)	0.97 (0.73–1.31)	0.92 (0.68–1.25)	0.94 (0.69–1.27)	0.90 (0.66–1.24)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.66* (0.58–0.75)	0.64* (0.56–0.73)	0.64* (0.55–0.73)	0.64* (0.55–0.73)	0.64* (0.54–0.75)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.78* (1.17–2.71)	2.03* (1.32–3.12)	1.48 (0.92–2.39)	1.49 (0.92–2.41)	1.41 (0.89–2.24)
Bisexual	1.23 (0.84–1.80)	1.48 (0.98–2.23)	1.40 (0.93–2.10)	1.38 (0.91–2.10)	1.27 (0.83–1.93)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Tobacco

Current Cigarette Smoking

Overall, 13.9 percent of survey respondents acknowledged currently smoking cigarettes. Regression results for current cigarette use are presented in Table 3.7.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic black service members were significantly less likely to report current smoking (OR = 0.55; 95 percent CI [0.38, 0.79])

Table 3.7
Minority Group Differences in Current Cigarette Smoking

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.55* (0.38–0.79)	0.54* (0.38–0.78)	0.48* (0.32–0.70)	0.45* (0.31–0.66)	0.47* (0.32–0.70)
Hispanic	1.00 (0.73–1.38)	0.98 (0.71–1.36)	0.80 (0.57–1.12)	0.78 (0.56–1.09)	0.82 (0.58–1.15)
Non-Hispanic Asian	0.89 (0.53–1.50)	0.89 (0.53–1.49)	0.96 (0.55–1.65)	0.84 (0.48–1.44)	0.90 (0.53–1.53)
Other single race	0.97 (0.60–1.58)	0.97 (0.60–1.57)	0.85 (0.51–1.42)	0.83 (0.49–1.39)	0.83 (0.49–1.39)
Multiple races	1.22 (0.82–1.84)	1.23 (0.82–0.86)	1.20 (0.79–1.83)	1.15 (0.76–1.73)	1.06 (0.69–1.62)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.77* (0.64–0.92)	0.71* (0.58–0.86)	0.85 (0.68–1.05)	0.85 (0.68–1.05)	0.80 (0.63–1.02)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.90* (1.07–3.36)	2.07* (1.16–3.70)	2.00* (1.01–3.96)	2.03* (1.03–4.02)	1.77 (0.89–3.51)
Bisexual	1.83* (1.11–2.99)	2.09* (1.25–3.52)	1.80* (1.01–3.23)	1.86* (1.05–3.29)	1.70 (0.94–3.07)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

compared with non-Hispanic whites. This difference remained significant in Minority Membership (Model 2; OR = 0.54; 95 percent CI [0.38, 0.78]), Individual Characteristics (Model 3; OR = 0.48; 95 percent CI [0.32, 0.70]), Military Experiences (Model 4; OR = 0.45; 95 percent CI [0.31, 0.66]), and Stressors/Risk Factors (Model 5; OR = 0.47; 95 percent CI [0.32, 0.70]). Overall, there appear to be lower rates of current smoking among non-Hispanic blacks compared with non-Hispanic white service members, even after controlling for available demographic and explanatory variables.

Gender. In bivariate analyses (Model 1), women (OR = 0.77; 95 percent CI [0.64, 0.92]) had significantly lower rates of current smoking compared with men. Similarly, in Minority Membership (Model 2), women had significantly lower rates of current smoking (OR = 0.71; 95 percent CI [0.58–0.86]). However, no gender differences were observed in Individual Characteristics (Model 3), Military Experiences (Model 4), or Stressors/Risk Factors (Model 5).

Sexual Orientation. In bivariate analyses (Model 1), both gay/lesbian (OR = 1.90; 95 percent CI [1.07, 3.36]) and bisexual (OR = 1.83; 95 percent CI [1.11, 2.99]) service members had significantly elevated rates of current smoking compared with heterosexual service members. The differences remained significant in Minority Membership (Model 2), Individual Characteristics (Model 3), and Military Experiences (Model 4). When controlling for race/ethnicity and gender in Minority Membership (Model 2), gay/lesbian (OR = 2.07; 95 percent CI [1.16–3.70]) and bisexual (OR = 2.09; 95 percent CI [1.25–3.52]) service members had elevated rates of current smoking. Similarly, gay/lesbian (OR = 2.00; 95 percent CI [1.01–3.96]) and bisexual (OR = 1.80; 95 percent CI [1.01–3.23]) service members were significantly more likely to be current smokers in Individual Characteristics (Model 3) as well as Military Experiences (Model 4; gay/lesbian OR = 2.03; 95 percent CI [1.03–4.02]; bisexual OR = 1.86; 95 percent CI [1.05–3.29]). No differences in rates of current smoking across sexual orientation groups were observed in Stressors/Risk Factors (Model 5), suggesting that controlling for these experiences was able to account for sexual minority differences in current cigarette smoking. The OR for gay/lesbian service members was reduced by roughly 15 percent between Minority Membership (Model 2) and Stressors/Risk Factors (Model 5), from 2.07 in Model 2 to 1.77 in Model 5, and roughly 20 percent for bisexual service members, from 2.09 in Model 2 to 1.70 in Model 5.

Daily Cigarette Smoking

Overall, 7.5 percent of all service members reported smoking cigarettes daily. Regression results for daily cigarette use are presented in Table 3.8.

Race/Ethnicity. In bivariate analyses (Model 1), of current smokers, non-Hispanic black and Hispanic service members were significantly less likely to report daily smoking (OR = 0.46; 95 percent CI [0.29, 0.72] and 0.57; 95 percent CI [0.36, 0.91], respectively) compared with non-Hispanic whites. This difference remained significant and of significant magnitude in all four subsequent models. Overall, there appears to be slightly lower rates of daily smoking among non-Hispanic black and Hispanic service members compared with white service members, even after controlling for available demographic and explanatory variables.

Gender. In both bivariate and adjusted models, we did not find evidence of significantly different rates of daily smoking by gender.

Sexual Orientation. In bivariate analyses (Model 1), both gay/lesbian (OR = 3.08; 95 percent CI [1.58, 6.04]) and bisexual (OR = 1.81; 95 percent CI [1.02, 3.22]) service members had significantly elevated rates of daily smoking compared with heterosexual service members. Significant differences by sexual orientation were observed in Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5). When controlling for race/ethnicity and gender in Minority Membership (Model 2), rates of current smoking remained elevated among gay/lesbian (OR = 3.26; 95 percent CI [1.62, 6.55]) and bisexual (OR = 2.02; 95 percent CI [1.13, 3.59]) service members. Gay/lesbian (OR = 3.63; 95 percent CI [1.58, 8.34]), but not bisexual, service members were significantly more likely to be current smokers in Individual Characteristics (Model 3). In

Table 3.8
Minority Group Differences in Daily Cigarette Smoking

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.46* (0.29–0.72)	0.44* (0.28–0.70)	0.37* (0.23–0.60)	0.35* (0.21–0.56)	0.36* (0.22–0.59)
Hispanic	0.57* (0.36–0.91)	0.56* (0.35–0.88)	0.45* (0.28–0.73)	0.44* (0.27–0.71)	0.45* (0.28–0.74)
Non-Hispanic Asian	0.66 (0.34–1.28)	0.65 (0.35–1.23)	0.71 (0.37–1.36)	0.65 (0.34–1.24)	0.73 (0.38–1.40)
Other single race	0.85 (0.45–1.59)	0.84 (0.45–1.56)	0.68 (0.36–1.30)	0.66 (0.34–1.26)	0.65 (0.34–1.24)
Multiple races	0.99 (0.59–1.66)	0.99 (0.59–1.66)	0.94 (0.56–1.57)	0.90 (0.54–1.51)	0.80 (0.48–1.36)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.92 (0.74–1.16)	0.83 (0.65–1.07)	1.04 (0.79–1.38)	1.06 (0.79–1.41)	0.97 (0.69–1.35)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	3.08* (1.58–6.04)	3.26* (1.62–6.55)	3.63* (1.58–8.34)	3.72* (1.60–8.62)	3.15* (1.35–7.35)
Bisexual	1.81* (1.02–3.22)	2.02* (1.13–3.59)	1.80 (0.97–3.37)	1.89* (1.02–3.51)	1.62 (0.88–3.00)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Military Experiences (Model 4), both gay/lesbian (OR = 3.72; 95 percent CI [1.60, 8.62]) and bisexual (OR = 1.89; 95 percent CI [1.02, 3.51]) service members had higher odds of current smoking than heterosexual service members. Gay/lesbian (OR = 3.15; 95 percent CI [1.35, 7.35]), but not bisexual, service members were significantly more likely to be current smokers in Stressors/Risk Factors (Model 5). The inclusion of stressors and risk factors in the model attenuated the significance of the OR for bisexual service members. The overall reduction in the OR from Model 2 to Model 5 was roughly 20 percent, from 2.02 to 1.62.

Smokeless Tobacco Use

Overall, 12.7 percent of survey respondents reported using smokeless tobacco in the past year. Regression results for smokeless tobacco are presented in Table 3.9.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic Asian (OR = 0.06; 95 percent CI [0.02, 0.24]), non-Hispanic black (OR = 0.23; 95 percent CI [0.12, 0.42]), and Hispanic (OR = 0.55, [95 percent CI 0.38, 0.78]) service members were significantly less likely to report use of smokeless tobacco in the past year compared with non-Hispanic white service

Table 3.9
Minority Group Differences in Smokeless Tobacco Use

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.23* (0.12–0.42)	0.24* (0.13–0.44)	0.23* (0.13–0.43)	0.23* (0.12–0.42)	0.24* (0.13–0.44)
Hispanic	0.55* (0.38–0.78)	0.55* (0.38–0.78)	0.46* (0.32–0.67)	0.46* (0.31–0.67)	0.48* (0.33–0.70)
Non-Hispanic Asian	0.06* (0.02–0.24)	0.07* (0.02–0.25)	0.07* (0.02–0.26)	0.06* (0.02–0.25)	0.07* (0.02–0.27)
Other single race	0.62 (0.35–1.10)	0.63 (0.35–1.13)	0.56 (0.31–1.01)	0.55 (0.30–1.01)	0.58 (0.32–1.05)
Multiple races	0.71 (0.42–1.20)	0.76 (0.45–1.30)	0.71 (0.41–1.24)	0.69 (0.40–1.21)	0.69 (0.40–1.20)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.12* (0.09–0.16)	0.12* (0.09–0.17)	0.13* (0.09–0.19)	0.13* (0.09–0.19)	0.14* (0.10–0.21)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	0.30* (0.15–0.58)	0.41* (0.20–0.85)	0.39* (0.18–0.84)	0.39* (0.18–0.84)	0.38* (0.18–0.82)
Bisexual	0.86 (0.41–1.77)	1.46 (0.65–3.26)	1.41 (0.61–3.25)	1.41 (0.61–3.28)	1.49 (0.65–3.45)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

members. This difference remained significant and of similar magnitude in Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5). Overall, there appear to be slightly lower rates of smokeless tobacco use in the past year among non-Hispanic Asian, non-Hispanic black, and Hispanic service members compared with non-Hispanic white individuals, even after controlling for available demographic and explanatory variables.

Gender. In bivariate analyses (Model 1), women (OR = 0.12; 95 percent CI [0.09, 0.16]) had significantly lower rates of smokeless tobacco use compared with men. This difference persisted across Minority Membership (Model 2; OR = 0.12; 95 percent CI [0.09, 0.17]), Individual Characteristics (Model 3; OR = 0.13; 95 percent CI [0.09, 0.19]), Military Experiences (Model 4; OR = 0.13; 95 percent CI [0.09, 0.19]), and Stressors/Risk Factors (Model 5; OR = 0.14; 95 percent CI [0.10, 0.21]).

Sexual Orientation. In bivariate analyses (Model 1), gay/lesbian (OR = 0.30; 95 percent CI [0.15, 0.58]), but not bisexual, service members had significantly lower rates of smokeless tobacco use compared with heterosexual service members. Reduced use by gay/lesbian service members persisted across Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5). When controlling for race/ethnicity and gender in Minority Membership (Model 2), rates of smokeless tobacco use remained lower among gay/lesbian (OR = 0.41; 95 percent CI [0.20–0.85]) service members. Similarly, gay/lesbian service members were significantly less likely to use smokeless tobacco in Individual Characteristics (Model 3; OR = 0.39; 95 percent CI [0.18–0.84]), Military Experiences (Model 4; OR = 0.39; 95 percent CI [0.18–0.84]), and Stressors/Risk Factors (Model 5; OR = 0.38; 95 percent CI [0.18–0.82]).

E-Cigarette Use

Overall, 12.4 percent of service members reported using e-cigarettes in the past month. Regression results for hazardous drinking are presented in Table 3.10.

Race/Ethnicity. In both bivariate and adjusted models, we did not find evidence of significantly different rates of e-cigarette use by race/ethnicity.

Gender. In bivariate analyses (Model 1), women (OR = 0.68; 95 percent CI [0.56, 0.83]) had significantly lower rates of e-cigarette use compared with men. This difference persisted across Minority Membership (Model 2; OR = 0.60; 95 percent CI [0.49, 0.75]), Individual Characteristics (Model 3; OR = 0.59; 95 percent CI [0.47, 0.75]), Military Experiences (Model 4; OR = 0.59; 95 percent CI [0.46, 0.75]), and Stressors/Risk Factors (Model 5; OR = 0.53; 95 percent CI [0.40, 0.69]).

Sexual Orientation. In bivariate analyses (Model 1), bisexual (OR = 2.91; 95 percent CI [1.80, 4.71]), but not gay/lesbian, service members had significantly elevated rates of e-cigarette use compared with heterosexual service members. Significant differences by sexual orientation were observed in Minority Membership (Model 2), Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5). Specifically, bisexual service members had higher likelihood of e-cigarette use in Minority Membership (Model 2; OR = 3.44; 95 percent CI [2.06, 5.72]), Individual Characteristics (Model 3; OR = 2.35; 95 percent CI [1.42, 3.89]), Military Experiences (Model 4; OR = 2.39; 95 percent CI [1.44, 3.96]), and Stressors/Risk Factors (Model 5; OR = 2.52; 95 percent CI [1.50, 4.25]). No differences between gay/lesbian and heterosexual service members in e-cigarette use were observed in any model.

Table 3.10
Minority Group Differences in E-Cigarette Use

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.76 (0.50–1.14)	0.74 (0.50–1.10)	0.75 (0.50–1.12)	0.73 (0.48–1.09)	0.78 (0.52–1.18)
Hispanic	1.33 (0.97–1.84)	1.31 (0.95–1.82)	1.00 (0.71–1.42)	0.99 (0.70–1.40)	1.05 (0.75–1.49)
Non-Hispanic Asian	0.60 (0.34–1.09)	0.61 (0.34–1.10)	0.73 (0.40–1.34)	0.69 (0.37–1.26)	0.71 (0.39–1.28)
Other single race	0.82 (0.43–1.56)	0.82 (0.43–1.56)	0.84 (0.43–1.65)	0.83 (0.43–1.62)	0.83 (0.44–1.60)
Multiple races	1.30 (0.85–1.99)	1.29 (0.84–1.97)	1.23 (0.80–1.91)	1.21 (0.78–1.88)	1.14 (0.73–1.78)
Gender					
Male	REF	REF	REF	REF	REF
Female	0.68* (0.56–0.83)	0.60* (0.49–0.75)	0.59* (0.47–0.75)	0.59* (0.46–0.75)	0.53* (0.40–0.69)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.02 (0.60–1.73)	1.15 (0.66–2.02)	0.85 (0.44–1.65)	0.85 (0.43–1.65)	0.69 (0.35–1.36)
Bisexual	2.91* (1.80–4.71)	3.44* (2.06–5.72)	2.35* (1.42–3.89)	2.39* (1.44–3.96)	2.52* (1.50–4.25)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Chapter Summary

This chapter presented results from a series of nested regression models that were designed to identify possible minority group differences among active duty service members using survey data from the 2015 HRBS. The models also included a set of behavioral and sociocultural environmental factors that had the potential to explain any significant differences that were identified. Table 3.11 summarizes the results. Green cells in the table (also denoted by <) indi-

Table 3.11
Summary of Military Minority Group Differences and Explanatory Factors

	Race/Ethnicity (Reference: Non-Hispanic White)					Gender (Reference: Male)	Sexual Orientation (Reference: Heterosexual)	
Outcomes	**Non-Hispanic Black**	**Hispanic**	**Non-Hispanic Asian**	**Other Single Race**	**Multiracial**	**Female**	**Gay/Lesbian**	**Bisexual**
Depression						> 1,3,4,5		> 1,2,3,4
Suicidal ideation	< 1,2,3,4,5	< 1,2,3,4,5				> 1	> 1,2,4	> 1,2,3,4
Suicide attempt	> 1,2,3,4,5		> 1,2,3,4,5			> 1		> 1,2,3,4
PTSD				> 1,2				
Hazardous drinking	< 1,2,3,4,5	< 1,2,3,4,5	< 1,2,3,4,5	< 1,2,3,5		< 1,2,3,4,5	> 1,2	> 2
Binge drinking	< 1,2,3,4,5		< 1,2,3,4,5			< 1,2,3,4,5	> 1,2	
Current cigarette smoking	< 1,2,3,4,5					< 1,2	> 1,2,3,4	> 1,2,3,4
Daily cigarette smoking	< 1,2,3,4,5	< 1,2,3,4,5					> 1,2,3,4,5	> 1,2,4
Smokeless tobacco	< 1,2,3,4,5	< 1,2,3,4,5	< 1,2,3,4,5			< 1,2,3,4,5	< 1,2,3,4,5	
Electronic cigarette use						< 1,2,3,4,5		> 1,2,3,4,5

NOTES: Superscript numerals indicate models in which the disparity is statistically significant.

Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

< Indicates a reverse disparity in which the minority group is better than the majority group (also indicated by a green cell).

> Indicates a disparity in which the minority group is worse than the majority group (also indicated by a red cell).

cate a reverse disparity. That is, the minority group fares better than the majority group on the outcome in question. In contrast, red cells in the table (denoted by >) indicate a disparity in which the minority group fares worse than the majority group on the outcome. The numbers in the table refer to the different model specifications (e.g., Model 2 is the Minority Membership model). Model numbers in the table indicate those specifications in which the minority group difference is statistically significant.

Based on Table 3.11, we can ascertain that there are no systematic minority group differences across the set of outcomes we examined. However, there are some trends that are worthy of note:

- There are a substantial number of reverse disparities in the military—where racial/ethnic minority groups fare better than their majority peers. For example, among non-Hispanic blacks, we found a reverse disparity for suicidal ideation, hazardous drinking, binge drinking, current cigarette use, daily cigarette use, and smokeless tobacco use. Non-Hispanic blacks engage in these behaviors significantly *less* than their non-Hispanic white peers, and we were unable to explain these reverse disparities with the sociocultural environmental factors that were included in our models. We found similar reverse disparities for Hispanics and non-Hispanic Asians compared with non-Hispanic whites. Only a few racial/ethnic disparities were revealed but were limited in precision due to sample size. Likelihood of suicide attempt was greater among non-Hispanic black and non-Hispanic Asian service members compared with non-Hispanic whites even after controlling for a host of sociocultural environmental factors (i.e., sociodemographic characteristics, military experiences, and stressors).
- For gender, we found disparities that are consistent with the civilian literature: women are more likely to report probable depression, suicidal ideation, and suicide attempts, whereas males are more likely to abuse alcohol and use tobacco products. With few exceptions (i.e., suicidal ideation, suicide attempt, and current cigarette smoking), we were unable to attenuate these disparities with the explanatory factors in our models. With one exception (smokeless tobacco use), gay/lesbian service members were more likely to report suicidal ideation, alcohol misuse, and smoking compared to their heterosexual peers. Bisexual service members were more likely to report probable depression, suicidal ideation, suicide attempt, alcohol misuse, smoking, and electronic cigarette use compared with their heterosexual peers in the military. However, most of these disparities were at least partially attenuated by the inclusion of stressors and risk factors into the regression models such that by Stressors/Risk Factors (Model 5), the disparities were no longer statistically significant.

In Chapter Four we turn to the second aim of the study: examining whether minority group disparities are the same or different from a sociodemographically matched civilian sample.

CHAPTER FOUR

Military Versus Civilian Comparisons in Behavioral Health Outcomes

In this chapter we address the second aim of the study: to compare the behavioral health outcomes of minority groups in DoD to the outcomes of their representative sociodemographically matched civilian counterparts. To do so, we use a propensity score matching approach, which allows us to compare data from service members in the 2015 HRBS and civilians in the 2015 NSDUH, the 2015 and 2016 BRFSS, and the 2015 National Health and Nutrition Examination Survey (NHANES). These surveys were selected because they are nationally representative of U.S. adults, contain the sociodemographic characteristics needed for the matching process, and contain identical outcomes to the 2015 HRBS.

More details about the methods can be found in Appendix A, but briefly, these matching models are used to account for sociodemographic differences that exist between service members and civilians. For example, service members are predominately male and below the age of 30. The model "matches" the distribution of civilians to that of the military on the following sociodemographic characteristics: gender, age, race/ethnicity, marital status, educational attainment, parental status, and sexual orientation (when available). Race/ethnicity categories included non-Hispanic black, Hispanic, non-Hispanic Asian, other single race (i.e., American Indian/Native American, and Native Hawaiian/Pacific Islander), and multiracial. Only civilians employed full-time are included in the matching models.

This analysis focuses on the same outcomes described in Chapter Three. Key mental health outcomes include probable MDD, suicidal ideation, and suicide attempt.[1] Key substance use outcomes include binge drinking, heavy drinking, current cigarette smoking, daily cigarette smoking, current smokeless tobacco use, and current e-cigarette use.[2] Some outcomes are available in multiple data sets.

Tables in this chapter present matched prevalence rates, by minority group status, for service members in the HRBS and civilians in the NSDUH, BRFSS, and NHANES, depending on the outcome. We also present ORs for each minority group, which allows us to examine whether minorities have a higher or lower likelihood of an outcome than their majority peers, as well as whether the minority group differences we observe in the matched civilian sample (e.g., non-Hispanic white versus non-Hispanic blacks) are the same as in the military sample.

[1] PTSD was not included in the analyses because none of the existing nationally representative surveys contain the same measure of PTSD that was employed by the 2015 HRBS.

[2] We were unable to test for differences in the patterns of marijuana use across racial/ethnic, sexual orientation, and gender groups given the low prevalence of use in the military sample. Marijuana use is included as an opt-in module in the 2016 BRFSS, and only ten states administered it. Comparisons in marijuana use between the U.S. military, civilian, and matched civilian samples are available from the authors.

We begin by describing overall differences in outcomes between the military sample and the unmatched civilian sample and then between the military sample and the matched civilian sample, to provide a frame of reference for later minority group comparisons.

As a reminder, an OR of 1.00 indicates no difference between the minority and comparison group, an OR < 1.00 means that the minority group is less likely to report the behavioral condition, and OR > 1.00 means that the minority group is more likely to report the behavioral health condition. Small ORs, near 1.00, suggest small substantive differences between groups, even if the OR is statistically significant. Using the Cohen's d effect size framework, a large substantive difference corresponds to ORs over 4.27 or below 0.23 (d = 0.8), a medium difference corresponds to an OR of 0.40 or 2.48 (d = 0.5), and a small difference corresponds to an OR of 0.70 or 1.44 (d = 0.2). Large ORs may be substantively important regardless of statistical significance, especially if the size of the minority group is small. Such small samples can affect the power of analyses to detect significant effects.

Mental Health

Mental Health in the Military Compared to the Civilian Population

Rates of probable MDD, suicidal ideation, and suicide attempt were higher in the military sample compared with the overall U.S. civilian sample (see Table 4.1). Moreover, these differences between service members and civilians further widened when compared with sociodemographically matched civilian samples. The prevalence of reported probable MDD among the military sample (18.5 percent) was approximately two and four times higher compared with the overall civilian sample (8.1 percent) and the matched civilian sample (4.6 percent, p < .0001). Similarly, rates of suicidal ideation and suicide attempt among the military sample

Table 4.1
Prevalence of Probable Depression, Suicidal Ideation, and Suicidal Attempt Among U.S. Military, Civilian, and Matched Civilian Samples

	Probable MDD in the Past 2 Weeks[a] % (CI)	Suicidal Ideation in the Past 12 Months[b] % (CI)	Suicide Attempt in the Past 12 Months[b] % (CI)
Military (HRBS)	18.5 (17.1–19.9)	6.3 (5.4–7.3)	1.4 (1.0–2.0)
Civilian (NSDUH)	N/A	4.0 (3.8–4.3)	0.6 (0.5–0.7)
Matched civilian (NSDUH)	N/A	4.9 (4.3–5.6)	0.5 (0.3–0.6)
Civilian (NHANES)	8.1 (7.5–8.8)	N/A	N/A
Matched civilian (NHANES)	4.6 (2.8–7.2)	N/A	N/A
P-Value	p < .0001	p < .0001	p < .0001

NOTES: *P*-values are provided for comparisons between the military and matched civilian samples.

N/A = Data not available in the given data set.

[a] Probable MDD data come from the NHANES.

[b] Suicidal ideation and suicide attempt data come from the NSDUH.

(6.3 percent and 1.4 percent) were elevated in comparison with the overall civilian sample (4.0 percent and 0.6 percent) and to the matched civilian sample (4.9 percent, $p < .02$, and 0.5 percent, $p < .0001$).

Probable Depression by Race/Ethnicity

Though rates of reported symptoms of MDD appear higher in the military sample than the matched civilian sample, the pattern of racial/ethnic differences in the prevalence of symptoms of MDD is not significantly different in the military sample relative to the matched civilian sample from the NHANES ($p = 0.50$; see Table 4.2). In other words, the likelihood of reported symptoms of MDD among racial/ethnic minority groups relative to whites is no different between those same groups in the military and sociodemographically matched civilians.

Table 4.2
Prevalence and Odds Ratios of Probable Depression at 2 Weeks Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other/ Multiple Races % (CI)
Military (HRBS)	18.1 (16.3–20.0)	16.0 (12.6–19.9)	19.8 (16.3–23.8)	15.3 (9.4–22.9)	24.0 (19.5–28.9)
Matched civilian (NHANES)[a]	4.0 (2.5–6.1)	3.7 (1.7–7.0)	2.8 (1.3–5.1)	2.9 (0.9–6.6)	12.6 (1.8–37.0)
	OR	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.00	0.87	1.12	0.82	1.43
Matched civilian (NHANES)[a]	1.00	0.93	0.68	0.71	3.46

[a] The pattern of racial/ethnic differences across samples is not statistically significant ($p = 0.50$).

Probable Depression by Gender

The pattern of gender differences in the prevalence of probable depression was not significantly different in the military sample relative to the matched civilian sample from the NHANES ($p = 0.82$). Table 4.3 presents the rates and ORs of probable depression in the military sample versus matched civilian samples by gender.

Table 4.3
Prevalence and Odds Ratios of Probable Depression Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	17.7 (16.2–19.4)	22.5 (20.7–24.4)
Matched civilian (NHANES)[a]	4.4 (2.3–7.4)	6.2 (4.6–8.2)
	OR	**OR**
Military (HRBS)	1.00	1.34
Matched civilian (NHANES)[a]	1.00	1.45

[a] The pattern of gender differences across samples is not statistically significant ($p = 0.82$).

Probable Depression by Sexual Orientation

Likewise, the pattern of differences in the prevalence of probable depression by sexual orientation was not significantly different in the military sample relative to the matched civilian sample from the NHANES ($p = 0.38$; see Table 4.4).

Table 4.4
Prevalence and Odds Ratios of Probable Depression Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	17.3 (15.9–18.8)	18.9 (12.0–27.6)	33.3 (24.9–42.6)
Matched civilian (NHANES)[a]	3.6 (2.4–5.1)	8.8 (1.0–28.7)	13.3 (5.0–26.8)
	OR	**OR**	**OR**
Military (HRBS)	1.00	1.12	2.39
Matched civilian (NHANES)[a]	1.00	2.58	4.13

[a] The pattern of sexual identity differences across samples is not statistically significant ($p = 0.38$).

Suicidal Ideation and Suicide Attempt in the Past 12 Months

Suicidal Ideation and Suicide Attempt in the Past 12 Months by Race/Ethnicity

Though the prevalence of suicidal ideation in the past 12 months was higher in the military, the pattern of racial/ethnic differences in suicidal ideation was not significantly different in the military sample relative to the matched civilian sample from the NSDUH ($p = 0.40$). See Table 4.5 for rates and ORs of suicidal ideation for the military and matched civilian samples by racial/ethnic groups.

In contrast, the pattern of racial/ethnic group differences in suicide attempt was significantly different between the military and matched civilian samples ($p = 0.0002$; see Table 4.6). First, in the military, non-Hispanic black service members had *greater* odds for suicidal attempt (OR = 1.76) than non-Hispanic white service members. In comparison, in the matched civilian NSDUH sample, non-Hispanic blacks had *lower* odds of suicide attempt (OR = 0.31) relative to their non-Hispanic white peers. Second, a similar pattern was observed in the comparison between Hispanic and non-Hispanic white individuals ($p < 0.05$). Relative to their non-Hispanic white counterparts, Hispanic military personnel reported greater odds for suicide attempt (OR = 1.23), whereas Hispanic respondents from the matched civilian NSDUH sample reported lower odds (OR = 0.50). Last, a statistically significant difference in the pattern of racial/ethnic differences was found in the comparison between other single-race and non-Hispanic white individuals ($p < 0.0001$). In the military, other single-race service members reported lower odds of suicide attempt (OR = 0.01) than their non-Hispanic white peers. However, other single-race civilians reported higher likelihood of suicide attempt (OR = 1.69) than non-Hispanic white civilians.

Table 4.5
Prevalence and Odds Ratios of Suicidal Ideation in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other % (CI)	Multiple % (CI)
Military (HRBS)	7.0 (5.7–8.4)	4.0 (2.2–6.8)	3.9 (2.3–6.1)	7.4 (2.8–15.4)	6.2 (2.2–13.2)	9.8 (5.8–15.3)
Matched civilian (NSDUH)[a]	5.0 (4.2–5.9)	4.8 (2.5–8.2)	4.6 (3.0–6.5)	3.5 (2.2–5.2)	3.4 (1.3–7.1)	8.1 (5.0–12.3)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.00	0.56	0.54	1.07	0.88	1.46
Matched civilian (NSDUH)[a]	1.00	0.95	0.90	0.68	0.66	1.66

[a] The pattern of racial/ethnic differences across samples is not statistically significant ($p = 0.40$).

Table 4.6
Prevalence and Odds Ratios of Suicide Attempt in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black* % (CI)	Hispanic* % (CI)	Non-Hispanic Asian % (CI)	Other* % (CI)	Multiple % (CI)
Military (HRBS)	1.1 (0.7–1.7)	1.9 (0.6–4.8)	1.4 (0.5–3.0)	4.0 (0.6–12.4)	0.0 (0.0–0.6)	1.9 (0.5–4.9)
Matched civilian (NSDUH)[a]	0.5 (0.3–0.7)	0.1 (0.1–0.3)	0.2 (0.1–0.4)	0.9 (0.2–2.2)	0.8 (0.0–3.6)	1.1 (0.4–2.3)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.00	1.76	1.23	3.66	0.01	1.74
Matched civilian (NSDUH)[a]	1.00	0.31	0.50	1.82	1.69	2.32

[a] The pattern of racial/ethnic differences across samples is statistically significant ($p < 0.0001$).

[*] Denotes significant subgroup differences ($p < 0.05$).

In sum, non-Hispanic black and Hispanic groups in the military report significant disparities in suicide attempt but in the civilian population reverse disparities are observed. On the other hand, we find the opposite pattern among other single-race groups, for whom a significant disparity in suicide attempt was observed in the civilian population but a reverse disparity was found in the military.

Suicidal Ideation and Suicide Attempt in the Past 12 Months by Gender

Though the military sample was more likely to report an episode of suicidal ideation in the past 12 months, as described above, the pattern of differences in suicidal ideation by gender was not significantly different in the military sample relative to the matched civilian sample from the NSDUH (p = 0.29; see Table 4.7).

Table 4.7
Prevalence and Odds Ratios of 12-Month Suicidal Ideation in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	6.2 (5.1–7.4)	6.9 (5.7–8.2)
Matched civilian (NSDUH)[a]	4.6 (3.9–5.4)	6.4 (4.9–8.3)
	OR	**OR**
Military (HRBS)[a]	1.00	1.12
Matched civilian (NSDUH)[a]	1.00	1.41

[a] The pattern of gender differences across samples is not statistically significant (p = 0.29).

Similarly, as seen in Table 4.8, the pattern of differences in suicide attempt by gender was not significantly different in the military sample relative to the matched civilian sample from the NSDUH (p = 0.62).

Table 4.8
Prevalence and Odds Ratios of Suicide Attempt in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	1.4 (0.9–2.0)	1.5 (0.9–2.3)
Matched civilian (NSDUH)[a]	0.5 (0.3–0.6)	0.6 (0.5–0.8)
	OR	**OR**
Military (HRBS)	1.00	1.09
Matched civilian (NSDUH)[a]	1.00	1.32

[a] The pattern of gender differences across samples is not statistically significant (p = 0.62).

Suicidal Ideation and Suicide Attempt in the Past 12 Months by Sexual Orientation

Though the prevalence of suicidal ideation in the past 12 months is higher in the military population, as described previously, the pattern of differences in suicidal ideation by sexual orientation was not significantly different in the military sample relative to the matched civilian sample from the NSDUH (p = 0.17). Table 4.9 presents suicidal ideation rates in the past 12 months and ORs for the military and matched civilian samples by sexual orientation.

Table 4.9
Prevalence and Odds Ratios of Suicidal Ideation in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	5.8 (4.9–6.9)	13.4 (7.0–22.4)	16.5 (9.6–25.6)
Matched civilian (NSDUH)[a]	4.2 (3.7–4.7)	12.8 (7.6–19.8)	20.4 (15.2–26.4)
	OR	**OR**	**OR**
Military (HRBS)	1.00	2.49	3.18
Matched civilian (NSDUH)[a]	1.00	3.38	5.90

[a] The pattern of gender differences across samples is not statistically significant (p = 0.17).

Likewise, the pattern of differences in suicide attempt in the past 12 months based on sexual orientation was not significantly different in the military sample relative to the matched civilian sample from the NSDUH (p = 0.48; see Table 4.10).

Table 4.10
Prevalence and Odds Ratios of Suicide Attempt in the Past 12 Months Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	1.3 (0.8–1.8)	4.6 (1.2–11.7)	3.6 (1.1–8.8)
Matched civilian (NSDUH)[a]	0.4 (0.3–0.6)	2.9 (0.8–7.5)	2.1 (1.1–3.5)
	OR	**OR**	**OR**
Military (HRBS)	1.00	3.78	2.96
Matched civilian (NHANES)[a]	1.00	7.62	5.32

[a] The pattern of gender differences across samples is not statistically significant (p = 0.48).

Substance Use

Alcohol Use in the Military Compared to the Civilian Population

As seen in Table 4.11, the rate of binge drinking in the military (30 percent) is higher than the overall U.S. samples from the NSDUH (27 percent) and the BRFSS (16 percent). However, this was no longer the case when the binge drinking rate in the military sample was compared with the sociodemographically matched civilian samples. The rate of binge drinking was actually significantly lower in the military sample compared with the matched civilian NSDUH sample ($p < 0.001$), but not significantly different from the matched civilian BRFSS sample ($p = 0.42$). Similarly, the rate of heavy drinking (at least four binge drinking episodes in the past 30 days) was significantly lower in the military sample compared with both the matched NSDUH civilian sample ($p < 0.001$) and the matched BRFSS civilian sample ($p < 0.016$). It is important to note that the NSDUH has been shown to yield higher rates of binge drinking than the BRFSS. This has been attributed to the use of audio computer-assisted self-interviewing in the NSDUH, which may be more anonymous than the computer-assisted telephone interviewing in the BRFSS (Substance Abuse and Mental Health Services Administration, undated). Thus, results for binge drinking and heavy drinking should be interpreted with caution when findings between the NSDUH and BRFSS are discrepant.

Table 4.11
Prevalence of Binge Drinking and Heavy Drinking in the Past 30 Days Among U.S. Military, Civilian, and Matched Civilian Samples

	Binge Drinking % (CI)	Heavy Drinking % (CI)
Military (HRBS)	30.0 (28.4–31.5)	8.5 (7.5–9.6)
Civilian (NSDUH)	27.1 (26.5–27.7)	9.4 (9.0–9.8)
Matched civilian (NSDUH)	36.4 (34.6–38.3)	14.8 (13.4–16.3)
Civilian (BRFSS)	16.3 (16.0–16.5)	5.4 (5.3–5.6)
Matched civilian (BRFSS)	29.2 (28.4–30.1)	10.1 (9.5–10.7)
P-values	NSDUH $p < 0.001$ BRFSS $p = 0.42$	NSDUH $p < 0.001$ BRFSS $p < 0.016$

P-values are provided for comparisons between the military and matched civilian samples.

Alcohol Use by Race/Ethnicity

Significant racial/ethnic group differences in the patterns of binge and heavy drinking were observed across the military sample and the matched civilian NSDUH sample ($p = 0.0039$). In both the military and matched civilian NSDUH samples, a reverse disparity was documented, with non-Hispanic blacks exhibiting lower rates of binge drinking relative to their non-Hispanic white peers. As seen in Table 4.12, relative to their non-Hispanic white counterparts, non-Hispanic blacks in the military had lower odds of binge drinking (OR = 0.46) than non-Hispanic blacks from the matched civilian NSDUH sample (OR = 0.65; $p = 0.006$). The pattern of minority/white differences for binge drinking was not significantly different between the matched BRFSS civilian sample and the military sample ($p = 0.8667$).

Table 4.12
Prevalence and Odds Ratios of Binge Drinking Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black* % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other % (CI)	Multiple % (CI)
Military (HRBS)	32.7 (30.7–34.8)	18.3 (14.6–22.5)	31.0 (26.9–35.3)	21.3 (14.9–28.9)	29.0 (21.7–37.3)	31.5 (25.6–37.8)
Matched civilian (NSDUH)[a]	41.5 (39.2–43.8)	31.5 (26.9–36.4)	32.9 (28.4–37.7)	17.7 (13.7–22.3)	21.7 (12.2–34.1)	38.7 (31.8–46.0)
Matched civilian (BRFSS)[b]	32.7 (31.6–33.7)	17.7 (15.3–20.3)	27.9 (25.6–30.3)	18.2 (15.1–21.6)	27.7 (21.5–34.6)	30.6 (25.3–36.4)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.00	0.46	0.92	0.56	0.84	0.95
Matched civilian (NSDUH)[a]	1.00	0.65	0.69	0.30	0.39	0.89
Matched civilian (BRFSS)[b]	1.00	0.44	0.80	0.46	0.79	0.91

[a] The pattern of racial/ethnic differences across samples is statistically significant for the NSDUH ($p < 0.0039$).

[b] The pattern of racial/ethnic differences across samples is not statistically significant for the BRFSS ($p = 0.8667$).

* Denotes significant subgroup differences ($p < 0.006$).

The pattern of minority/white differences for heavy drinking was also significantly different between the military sample and the matched NSDUH civilian sample ($p < 0.0053$). Specifically, even though other single-race individuals both in the military and matched civilian NSDUH samples had lower odds of heavy drinking relative to their corresponding non-Hispanic white peers ($p = 0.0061$), other single-race individuals in the matched NSDUH civilian sample had even lower odds (OR = 0.17) than those in the military (OR = 0.82). The lower rates of heavy drinking among other race individuals (3.6 percent) relative to non-Hispanic whites (18.6 percent) in the matched civilian NSDUH sample essentially disappears in the military sample (7.7 percent other race compared with 9.3 percent non-Hispanic white).

However, it should be noted that the pattern of minority/white differences for heavy drinking was not significantly different between the matched BRFSS civilian sample and the military sample (p = 0.552; see Table 4.13).

Table 4.13
Prevalence and Odds Ratios of Heavy Drinking Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other* % (CI)	Multiple % (CI)
Military (HRBS)	9.3 (7.9–10.8)	6.1 (3.7–9.4)	8.9 (6.4–11.8)	4.5 (1.9–9.1)	7.7 (3.8–13.8)	9.0 (5.4–13.8)
Matched civilian (NSDUH)[a]	18.6 (16.5–20.8)	11.9 (8.0–16.9)	10.7 (8.3–13.5)	6.5 (3.7–10.4)	3.6 (1.8–6.5)	13.5 (9.4–18.4)
Matched civilian (BRFSS)[b]	11.4 (10.6–12.2)	5.6 (4.4–6.9)	8.7 (7.3–10.1)	4.4 (3.1–5.9)	13.1 (7.4–20.9)	12.0 (8.6–16.1)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.00	0.64	0.95	0.46	0.82	0.97
Matched civilian (NSDUH)[a]	1.00	0.59	0.52	0.30	0.17	0.68
Matched civilian (BRFSS)[b]	1.00	0.46	0.74	0.35	1.17	1.06

[a] The pattern of racial/ethnic differences across samples is statistically significant for the NSDUH ($p < 0.0053$).

[b] The pattern of racial/ethnic differences across samples is not statistically significant for the BRFSS (p = 0.552).

* Denotes significant subgroup differences.

Alcohol Use by Gender

There was no evidence that patterns of binge drinking or heavy drinking between the military sample and the matched NSDUH civilian sample significantly differed by gender (binge drinking, p = 0.66; heavy drinking, p = 0.053). Similarly, there was no evidence that patterns of binge drinking or heavy drinking by gender differed significantly between the military sample and the matched BRFSS civilian sample (binge drinking, p = 0.23; heavy drinking, p = 0.552). Across both the military and matched civilian samples, women reported similarly lower rates of binge drinking and heavy drinking relative to men (see Tables 4.14 and 4.15).

Table 4.14
Prevalence and Odds Ratios of Binge Drinking Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	31.2 (29.4–33.1)	23.0 (21.4–24.8)
Matched civilian (NSDUH)[a]	37.7 (35.6–39.9)	29.5 (26.9–32.1)
Matched civilian (BRFSS)[b]	30.7 (29.7–31.8)	21.1 (19.9–22.2)
	OR	**OR**
Military (HRBS)	1.0	0.66
Matched civilian (NSDUH)[a]	1.0	0.69
Matched civilian (BRFSS)[b]	1.0	0.60

[a] The pattern of gender differences across samples is not statistically significant for the NSDUH ($p < 0.6604$).
[b] The pattern of gender differences across samples is not statistically significant for the BRFSS ($p = 0.2316$).

Table 4.15
Prevalence and Odds Ratios of Heavy Drinking Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	9.4 (8.2–10.7)	3.8 (3.1–4.6)
Matched civilian (NSDUH)[a]	15.9 (14.2–17.6)	9.1 (7.5–11.0)
Matched civilian (BRFSS)[b]	10.9 (10.2–11.6)	5.7 (5.1–6.4)
	OR	**OR**
Military (HRBS)	1	0.38
Matched civilian (NSDUH)[a]	1	0.53
Matched civilian (BRFSS)[b]	1	0.50

[a] The pattern of gender differences across samples is statistically significant for the NSDUH ($p < 0.0563$).
[b] The pattern of gender differences across samples is not statistically significant for the BRFSS ($p = 0.648$).

Alcohol Use by Sexual Orientation

The patterns of binge drinking by sexual orientation were not significantly different in the military sample relative to the matched NSDUH civilian sample ($p = 0.17$). In contrast, the overall pattern of sexual orientation differences for reported heavy drinking was significantly different between the military and matched NSDUH civilian sample ($p = 0.04$). While neither pairwise comparison for gay/lesbian nor bisexual individuals was statistically significant, results indicate that the odds of gay/lesbian service members reporting heavy drinking (OR = 2.32) were greater

than the odds of gay/lesbian matched civilians reporting heavy drinking (OR = 1.25) relative to their corresponding heterosexual peers (see Tables 4.16 and 4.17). Relative to their heterosexual peers, bisexual service members reported greater odds of heavy drinking (OR = 1.23) in contrast bisexual matched civilians reported lower odds of heavy drinking (OR = 0.86).

Table 4.16
Prevalence and Odds Ratios of Binge Drinking Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	29.3 (27.6–31.1)	42.5 (32.3–53.1)	33.7 (25.4–42.8)
Matched civilian (NSDUH)[a]	38.5 (37.1–39.9)	43.9 (34.1–54.0)	35.0 (29.2–41.1)
	OR	**OR**	**OR**
Military (HRBS)	1.0	1.78	1.23
Matched civilian (NSDUH)[a]	1.0	1.25	0.86

[a] The pattern of sexual orientation differences across samples is not statistically significant for the NSDUH ($p = 0.1713$).

Table 4.17
Prevalence and Odds Ratios of Heavy Drinking Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	8.1 (7.0–9.3)	17.0 (9.1–27.7)	11.3 (5.1–20.6)
Matched civilian (NSDUH)	14.6 (13.6–15.6)	15.7 (10.6–21.9)	11.1 (7.6–15.4)
	OR	**OR**	**OR**
Military (HRBS)	1.0	2.32	1.44
Matched civilian (NSDUH)	1.0	1.08	0.73

[a] The pattern of sexual orientation differences across samples is statistically significant for the NSDUH ($p = 0.0461$); however, neither pairwise comparison (i.e., heterosexual vs. gay/lesbian or heterosexual vs. bisexual) was significant at the $p < 0.05$ level.

Tobacco Use in the Military Versus the Civilian Population

The rate of current smoking was significantly lower in the military sample than in the matched NSDUH civilian sample ($p < 0.0003$) and the matched BRFSS civilian sample ($p = 0.0099$; see Table 4.18). The rate of daily smoking was also significantly lower in the military sample than in the matched NSDUH civilian sample ($p = 0.0008$) but did not significantly differ from the matched BRFSS civilian sample ($p = 0.10$). The rate of current smokeless tobacco use was significantly higher in the military sample than in the matched NSDUH civilian sample ($p < 0.001$) and the matched BRFSS civilian sample ($p < 0.001$). The rate of e-cigarette use was significantly higher in the military sample than in the matched BRFSS civilian sample ($p < 0.001$).

Table 4.18
Prevalence and Odds Ratios of Current Tobacco Use Among U.S. Military, Civilian, and Matched Civilian Samples

	Current Smoker[a] % (CI)	Current Smoker[b] % (CI)	Daily Smoker % (CI)	Current Smokeless Tobacco User % (CI)	Current E-Cigarette User % (CI)
Military (HRBS)	17.1 (15.7–18.5)	N/A	8.4 (7.4–9.5)	12.7 (11.5–14.0)	11.6 (10.4–12.8)
Civilian (NSDUH)	19.3 (18.7–19.8)	N/A	12.4 (11.9–12.8)	3.7 (3.4–3.9)	N/A
Matched civilian (NSDUH)	21.6 (19.6–23.7)	N/A	11.2 (9.9–12.6)	7.2 (6.4–8.0)	N/A
Military (HRBS)	N/A	13.9[c] (12.7–15.3)	N/A	N/A	N/A
Civilian (BRFSS)	N/A	16.7[c] (16.5–17.0)	11.5[c] (11.3–11.7)	3.7[c] (3.5–3.8)	4.3[d] (4.1–4.4)
Matched civilian (BRFSS)	N/A	15.9[c] (15.2–16.6)	9.4[c] (8.9–9.9)	8.0[c] (7.4–8.5)	7.7[d] (7.1–8.3)
P-value	$p < 0.0003$	$p = 0.0099$	$p = 0.0008$	$p < 0.001$	$p < 0.001$

NOTE: N/A = Data not available in the given data set.

[a] Based on the 2015 NSDUH definition of current smoker as having smoked within the past 30 days.

[b] Based on the 2015 BRFSS definition of current smoker as "now smoking."

[c] Based on 2015 BRFSS data.

[d] Based on 2016 BRFSS data.

Tobacco Use by Race/Ethnicity

While the military sample reported lower rates of daily smoking and higher rates of smokeless tobacco and e-cigarette use than the matched civilian sample, the pattern of racial/ethnic differences was not significantly different across the military and matched civilian samples ($p > 0.05$; see Tables 4.19–4.22). Only patterns of current smoking (when defined as smoking in the past 30 days) varied by racial/ethnic group in the military and matched civilian NSDUH samples, specifically among non-Hispanic Asians, Hispanics, and other race individuals ($p = 0.0023$).

Non-Hispanic Asians in both the military and matched civilian samples had lower odds of current smoking (OR = 0.91 and OR = 0.35, respectively) compared with their non-Hispanic white peers, but risk was even lower among non-Hispanic Asians in the civilian population.

Relative to their non-Hispanic counterparts, Hispanics in the military were more likely to report current smoking (OR = 1.04), and, within the matched civilian NSDUH sample, a reverse disparity was observed (OR = 0.54).

In contrast, other race individuals experienced a reverse disparity in the military were less likely to report current smoking (OR = 0.93), whereas other race individuals in the matched civilian NSDUH sample were more likely to report current smoking (OR = 1.79) in smoking in the past 30 days relative to non-Hispanic white peers. Taken together, the tobacco patterns for Asians, Hispanics, and other race individuals were different in their relative risk and direction of disparity.

Table 4.19
Prevalence and Odds Ratios of Current Smoking Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic* % (CI)	Non-Hispanic Asian* % (CI)	Other* % (CI)	Multiple % (CI)
Smoked in the past 30 days						
Military (HRBS)	17.8 (16.0–19.7)	11.0 (8.0–14.6)	18.4 (14.6–22.7)	16.4 (10.4–24.0)	16.7 (11.1–23.7)	20.5 (15.0–27.0)
Matched civilian (NSDUH)[a]	24.6 (22.3–27.0)	12.5 (10.3–14.8)	15.0 (11.3–19.5)	10.3 (7.2–14.1)	36.9 (17.2–60.5)	25.2 (19.7–31.4)
Now smoking						
Military (HRBS)	14.6 (12.9–16.4)	8.5 (6.1–11.6)	14.6 (11.2–18.6)	13.2 (8.0–20.1)	14.3 (9.1–21.0)	17.3 (12.1–23.5)
Matched civilian (BRFSS)[b]	16.9 (16.1–17.8)	13.9 (11.9–16.0)	12.9 (11.4–14.6)	11.6 (9.3–14.2)	22.1 (17.8–26.8)	17.2 (13.5–21.4)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Smoked in the past 30 days						
Military (HRBS)	1.0	0.57	1.04	0.91	0.93	1.19
Matched civilian (NSDUH)[a]	1.0	0.44	0.54	0.35	1.79	1.03
Now smoking						
Military (HRBS)	1.0	0.55	1.0	0.89	0.97	1.22
Matched civilian (BRFSS)[b]	1.0	0.79	0.73	0.64	1.39	1.02

[a] The pattern of racial/ethnic differences across samples is statistically significant for the NSDUH ($p = 0.0023$).

[b] The pattern of racial/ethnic differences across samples is not statistically significant for the BRFSS ($p = 0.0528$).

[*] Denotes significant subgroup differences.

Table 4.20
Prevalence and Odds Ratios of Daily Smoking Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other % (CI)	Multiple % (CI)
Military (HRBS)	9.5 (8.1–11.1)	4.8 (3.1–7.1)	6.8 (4.5–9.8)	7.5 (4.0–12.8)	8.7 (4.8–14.3)	9.7 (6.0–14.6)
Matched civilian (NSDUH)[a]	13.9 (12.0–16.0)	5.5 (4.2–7.1)	5.4 (3.9–7.4)	6.8 (4.2–10.3)	11.2 (4.7–21.7)	16.4 (11.9–21.8)
Matched civilian (BRFSS)[b]	10.6 (9.9–11.3)	8.3 (6.9–10.0)	5.9 (4.8–7.2)	6.0 (4.3–8.0)	14.2 (10.6–18.4)	8.7 (6.5–11.3)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.0	0.48	0.69	0.78	0.91	1.02
Matched civilian (NSDUH)[a]	1.0	0.36	0.36	0.45	0.78	1.21
Matched civilian (BRFSS)[b]	1.0	0.77	0.53	0.54	1.40	0.81

[a] The pattern of racial/ethnic differences across samples is not statistically significant for the NSDUH ($p = 0.1553$).

[b] The pattern of racial/ethnic differences across samples is not statistically significant for the BRFSS ($p = 0.1052$).

Table 4.21
Prevalence and Odds Ratios of Current Smokeless Tobacco Use Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other % (CI)	Multiple % (CI)
Military (HRBS)	16.4 (14.7–18.3)	4.3 (2.2–7.5)	9.7 (7.0–13.0)	1.2 (0.2–4.1)	10.8 (6.0–17.6)	12.3 (7.3–18.9)
Matched civilian (NSDUH)[a]	10.1 (9.0–11.3)	2.3 (0.7–5.5)	3.3 (2.0–5.1)	1.3 (0.6–2.5)	3.4 (1.5–6.6)	8.3 (5.0–12.8)
Matched civilian (BRFSS)[b]	10.0 (9.3–10.8)	3.9 (2.4–6.0)	4.8 (3.5–6.4)	3.3 (2.2–4.7)	8.8 (5.9–12.5)	7.0 (4.6–10.2)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1	0.23	0.55	0.06	0.62	0.71
Matched civilian (NSDUH)[a]	1	0.21	0.30	0.11	0.31	0.80
Matched civilian (BRFSS)[b]	1	0.37	0.45	0.30	0.87	0.68

[a] The pattern of racial/ethnic differences across samples is not statistically significant for the NSDUH ($p = 0.2447$).
[b] The pattern of racial/ethnic differences across samples is not statistically significant for the BRFSS ($p = 0.1501$).

Table 4.22
Prevalence and Odds Ratios of Current E-Cigarette Use Among U.S. Military and Matched Civilian Samples, by Race/Ethnicity

	Non-Hispanic White % (CI)	Non-Hispanic Black % (CI)	Hispanic % (CI)	Non-Hispanic Asian % (CI)	Other % (CI)	Multiple % (CI)
Military (HRBS)	11.6 (10.1–13.2)	9.1 (6.2–12.8)	14.5 (11.1–18.3)	7.4 (4.0–12.4)	9.1 (4.7–15.8)	14.4 (9.8–20.0)
Matched civilian (BRFSS)[a]	8.3 (7.6–9.0)	4.7 (3.6–6.0)	6.7 (5.1–8.5)	4.9 (3.4–6.9)	10.4 (5.5–17.6)	11.8 (7.5–17.2)
	OR	**OR**	**OR**	**OR**	**OR**	**OR**
Military (HRBS)	1.0	0.76	1.29	0.61	0.77	1.28
Matched civilian (BRFSS)[a]	1.0	0.55	0.79	0.57	1.29	1.48

NOTE: The matched civilian sample is based on 2016 BRFSS data.
[a] The pattern of racial/ethnic differences across samples is not statistically significant ($p = 0.1157$).

Tobacco Use by Gender

There was no evidence that current smoking, daily smoking, current smokeless tobacco use, or current e-cigarette use differed significantly between men and women in the military sample and the matched civilian sample (see Tables 4.23–4.26). For all tobacco use behaviors, women reported lower rates than men; the magnitude of these gender differences was similar across the military and matched civilian samples.

Table 4.23
Prevalence and Odds Ratios of Current Smoking Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Smoked in the past 30 days		
Military (HRBS)	17.8 (16.2–19.5)	13.2 (11.7–14.7)
Matched civilian (NSDUH)[a]	22.6 (20.3–25.1)	16.3 (13.3–19.6)
Now smoking		
Military (HRBS)	14.4 (12.9–16.0)	11.4 (10.1–12.9)
Matched civilian (BRFSS)[b]	16.5 (15.7–17.3)	12.7 (11.9–13.5)
	OR	**OR**
Smoked in the past 30 days		
Military (HRBS)	1.00	0.70
Matched civilian (NSDUH)[a]	1.00	0.67
Now smoking		
Military (HRBS)	1.00	0.77
Matched civilian (BRFSS)[b]	1.00	0.74

[a] The pattern of gender differences across samples is not statistically significant for the NSDUH ($p = 0.7625$).
[b] The pattern of gender differences across samples is not statistically significant for the BRFSS ($p = 0.6674$).

Table 4.24
Prevalence and Odds Ratios of Daily Smoking Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	8.6 (7.4–9.8)	7.5 (6.5–8.7)
Matched civilian (NSDUH)[a]	11.7 (10.2–13.3)	8.8 (7.7–9.9)
Matched civilian (BRFSS)[b]	9.7 (9.1–10.3)	7.7 (7.1–8.4)
	OR	**OR**
Military (HRBS)	1.00	0.87
Matched civilian (NSDUH)[a]	1.00	0.73
Matched civilian (BRFSS)[b]	1.00	0.78

[a] The pattern of gender differences across samples is not statistically significant for the NSDUH ($p = 0.2489$).
[b] The pattern of gender differences across samples is not statistically significant for the BRFSS ($p = 0.4015$).

Table 4.25
Prevalence and Odds Ratios of Current Smokeless Tobacco Use Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	14.7 (13.3–16.2)	2.0 (1.4–2.7)
Matched civilian (NSDUH)[a]	8.3 (7.4–9.2)	1.4 (0.4–3.6)
Matched civilian (BRFSS)[b]	9.2 (8.6–9.9)	0.8 (0.7–1.1)
	OR	**OR**
Military (HRBS)	1.00	0.12
Matched civilian (NSDUH)[a]	1.00	0.16
Matched civilian (BRFSS)[b]	1.00	0.08

[a] The pattern of gender differences across samples is not statistically significant for the NSDUH ($p = 0.5515$).
[b] The pattern of gender differences across samples is not statistically significant for the BRFSS ($p = 0.0961$).

Table 4.26
Prevalence and Odds Ratios of Current E-Cigarette Use Among U.S. Military and Matched Civilian Samples, by Gender

	Male % (CI)	Female % (CI)
Military (HRBS)	12.2 (10.8–13.6)	8.5 (7.4–9.8)
Matched civilian (BRFSS)[a]	8.3 (7.6–9.0)	4.5 (3.9–5.1)
	OR	**OR**
Military (HRBS)	1.00	0.67
Matched civilian (BRFSS)[a]	1.00	0.52

NOTE: The matched civilian sample is based on 2016 BRFSS data.
[a] The pattern of gender differences across samples is not statistically significant ($p = 0.058$).

Tobacco Use by Sexual Orientation

We found no evidence that sexual orientation patterns in either current smoking ($p = 0.69$) or daily smoking ($p = 0.14$) were significantly different in the military sample relative to the matched NSDUH civilian sample. For both current and daily smoking, gay/lesbian and bisexual individuals reported higher rates than heterosexual individuals; the magnitude of these sexual orientation differences were similar across the military and matched civilian samples.

In contrast, the overall pattern of sexual orientation differences in current smokeless tobacco use was significantly different in the military sample relative to the matched NSDUH civilian sample (omnibus test, $p < 0.001$) although neither pairwise comparison for gay/lesbian

Table 4.27
Prevalence and Odds Ratios of Current Smoking in the Past 30 Days Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	16.0 (14.5–17.6)	25.6 (16.3–36.8)	23.0 (15.3–32.4)
Matched civilian (NSDUH)[a]	20.2 (18.9–21.6)	28.7 (21.1–37.3)	24.0 (18.8–29.9)
	OR	**OR**	**OR**
Military (HRBS)	1.00	1.80	1.57
Matched civilian (NSDUH)[a]	1.00	1.59	1.25

[a] The pattern of sexual orientation differences across samples is not statistically significant ($p = 0.69$).

Table 4.28
Prevalence and Odds Ratios of Daily Smoking Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian % (CI)	Bisexual % (CI)
Military (HRBS)	7.5 (6.5–8.7)	20.5 (11.6–32.3)	12.0 (6.9–18.9)
Matched civilian (NSDUH)[a]	10.8 (10.0–11.6)	15.5 (10.3–22.0)	14.0 (9.8–19.1)
	OR	**OR**	**OR**
Military (HRBS)	1.00	3.18	1.67
Matched civilian (NSDUH)[a]	1.00	1.52	1.35

[a] The pattern of sexual orientation differences across samples is not statistically significant for the BRFSS ($p = 0.14$).

Table 4.29
Prevalence and Odds Ratios of Current Smokeless Tobacco Use Among U.S. Military and Matched Civilian Samples, by Sexual Orientation

	Heterosexual % (CI)	Gay/Lesbian* % (CI)	Bisexual* % (CI)
Military (HRBS)	13.4 (12.0–14.8)	4.4 (2.1–8.1)	11.7 (5.4–21.3)
Matched civilian (NSDUH)[a]	8.2 (7.5–8.9)	0.5 (0.1–1.4)	1.6 (0.5–3.7)
	OR	**OR**	**OR**
Military (HRBS)	1.00	0.30	0.86
Matched civilian (NSDUH)[a]	1.00	0.06	0.18

[a] The pattern of sexual orientation differences across samples is statistically significant ($p < 0.001$).

* Denotes significant subgroup differences.

nor bisexual individuals was significant. In both the military and the civilian samples, the sexual orientation differences are reverse disparities, with gay/lesbian and bisexual individuals reporting lower rates of smokeless tobacco use than heterosexual individuals. However, gay/lesbian and bisexual individuals in the civilian matched NSDUH sample experience even lower odds (OR = 0.06 and OR = 0.18) than those in the military (OR = 0.30 and OR = 0.86). This suggests that being in the military is potentially associated with greater odds for smokeless tobacco use among sexual minority groups.

Chapter Summary

This chapter addressed the second aim of the study by comparing minority group differences between a military sample and sociodemographically matched civilian samples on a set of behavioral health outcomes. This allowed us to assess whether minority disparities in mental health and substance use are the same or different across these two populations, while controlling for known differences in key demographic characteristics. Table 4.30 summarizes the results.

The columns in the table correspond to the three civilian data sets used in the matching analysis: the NSDUH, BRFSS, and NHANES. Note that sexual orientation data from all 50 states was not available in the BRFSS and that we used the NHANES only for probable depression. Each row in the table represents a behavioral health outcome that we examined. The cells in the table indicate whether the overall population-matched estimate was statistically significantly different between the military sample (i.e., the HRBS) and the matched civilian sample. A superscript plus sign (+) indicates that the military sample had higher rates on the outcome than the civilian sample; a superscript minus sign (–) indicates that the military sample had a lower rate than the civilian sample (e.g., Overall+, Overall–). For minority group differences, cells list the group(s) for which we found significantly different patterns between the military and civilians (i.e., race/ethnicity, gender, and sexual orientation) as well as the specific subgroups in which we found a statistically significant difference between the disparity in the military sample and the civilian sample (e.g., Hispanic, Asian). If no pairwise comparison was significant, but the overall group difference was, the cell will contain an "NS group" label next to the group indicator—for example, SI (NS group). As an example, for suicide attempt in the NSDUH, we found that rates were higher in the military than in the matched civilian sample (Overall+). We also found different patterns of disparities by race/ethnicity across the military versus matched civilian samples. In the military sample, non-Hispanic black and Hispanic service members reported higher rates of suicide attempts relative to their non-Hispanic white peers. However, in the matched civilian sample, the opposite was true: non-Hispanic black and Hispanic civilians reported lower rates of suicide attempts relative to their non-Hispanic white peers.

The first key takeaway from Table 4.30 is that there are no consistent patterns. Second, rates of self-reported mental health conditions appear higher in the military than matched civilians, but we found few significant differences in reported patterns of minority-majority group differences across the mental health conditions. That is, although reported rates of mental health conditions are higher in the military population overall, minority-majority group differences across race/ethnicity, gender, and sexual orientation are generally consistent with what we observe among matched civilians. Third, for alcohol outcomes, reported rates of binge and heavy drinking are lower in the military compared to matched civilians. Again, we found few, inconsistent differences by minority group status. Fourth, for tobacco use, we

Table 4.30
Summary of Military-Civilian Minority Group Matched Comparisons

Outcome	NSDUH Matched	BRFSS Matched[a]	NHANES Matched
Mental Health			
Depression	Overall^{+}	N/A	Overall^{+}
Suicidal ideation	Overall^{+}	N/A	N/A
Suicide attempt	Overall^{+}, R/E (Black^{+}, Hispanic^{+}, Other^{-})	N/A	N/A
Alcohol			
Heavy drinking	Overall^{-}, R/E (Other^{+}), SO (NS group)	Overall^{-}	N/A
Binge drinking	Overall^{-}, R/E (Black^{-})		N/A
Tobacco			
Current smoking	Overall^{-}, R/E (Hispanic^{+}, Asian^{+}, Other^{-})	Overall^{-}	N/A
Daily smoking	Overall^{-}		N/A
Smokeless tobacco	Overall^{+}, SO (NS group)	Overall^{+}	N/A
E-cigarette use	N/A	Overall^{+}	N/A

NOTES:

[a] Sexual orientation data from all 50 states was not available in the BRFSS.

$^{+}$ Military higher prevalence compared with matched civilians.

$^{-}$ Military lower prevalence compared with matched civilians.

Overall = Difference between overall HRBS military sample and matched civilian sample.

R/E = Pattern of racial-ethnic differences across samples is statistically significant.

SO = Pattern of sexual orientation differences across samples is statistically significant.

NS group = No pairwise comparison was statistically significant.

found that, overall, service members smoke cigarettes at lower rates than their matched civilian peers but have higher rates of smokeless tobacco and e-cigarette use. Again, we found few, inconsistent differences by minority group status. Finally, service members are far less likely than their matched civilian peers to use marijuana, which is not surprising given DoD regulations surrounding its use and given frequent testing. We were unable to test for minority group differences in marijuana use given its low prevalence in the military.

Taken together, the results presented in this chapter suggest that minority-majority group differences in the reported behavioral health outcomes examined here appear to be no different in the military context than they are in the civilian world. Though we did find a small number of differences, largely associated with race/ethnicity, there was no clear pattern by subgroup.

CHAPTER FIVE

Key Findings and Policy Implications

Supporting the behavioral health of service members is central to maintaining a strong and ready force. In the civilian population, racial/ethnic minorities, women, and sexual orientation minorities have been shown to experience significant behavioral health disparities. Whether similar disparities exist in the military is not well understood given the dearth of studies on the behavioral health of these minority groups within the military. To understand whether minority group service members might be at elevated risk of behavioral health problems, we set out to answer the following two questions:

1. Are minority group service members more likely to experience behavioral health problems relative to their majority counterparts in the military? If so, are these differences still apparent after accounting for individual-level sociocultural environmental factors (e.g., age and education) and interpersonal-level sociocultural environmental factors (e.g., social support and sexual harassment)?
2. Do minority groups in the military experience similar or different behavioral health disparities compared with sociodemographically matched minority groups in the civilian population?

To address these questions, we used data from the 2015 HRBS (a survey of a representative sample of active duty service members), 2015 NSDUH, 2015 and 2016 BRFSS, and 2015 NHANES (a nationally representative surveys of U.S. adults).

In this chapter we review the key findings and discuss potential policy implications.

Military Minority-Majority Group Differences in Behavioral Health

Using data from the 2015 HRBS, we examined whether people from racial/ethnic minorities (i.e., non-Hispanic blacks, Hispanics, non-Hispanic Asians, people of other single races, and people of multiple races); women; and sexual minorities (i.e., lesbians/gay men and bisexuals) differ on in the prevalence of behavioral health conditions from their majority counterparts—that is, whites, men, and heterosexuals, respectively—within the military.

Findings indicate that minority group service members experiencing significant behavioral health disparities relative to their majority group counterparts, but that the pattern greatly varied across the minority groups. Key findings include the following:

- Racial/ethnic minority service members reported mostly reverse disparities. Only one disparity (where minorities had higher rates of a behavioral health condition nonminority

peers) was observed after controlling for the full set of explanatory factors. Specifically, non-Hispanic black and Asian service members were more likely to report suicide attempt in the past 12 months relative to non-Hispanic white service members. As noted, this disparity persisted even after accounting for a host of sociocultural environmental risk factors, suggesting the potential role of other risk factors that were not assessed (e.g., discrimination). However, the precision of these estimates may have been limited given the low incidence of suicide attempts.

- Female service members exhibited greater prevalence of mental health problems (i.e., probable depression, suicidal ideation, and suicide attempt) but lower prevalence on substance use problems when compared with male service members. Female service members' higher likelihood for reporting probable depression was not attenuated after accounting for sociocultural environmental risk factors. In contrast, gender disparities in suicidal ideation and suicide attempt were no longer significant when other minority characteristics (i.e., race/ethnicity, sexual identity) were accounted for. Thus, it is unclear whether the observed gender disparities in suicidal behavior can be attributed to gender or to race/ethnicity or sexual orientation.
- Sexual orientation minority service members reported the most extensive disparities across the set of behavioral health outcomes, but these disparities were largely accounted for by sociocultural environmental stressors.
  - Gay/lesbian service members reported a higher likelihood of suicidal ideation, alcohol misuse (i.e., hazardous drinking, binge drinking), current smoking, and daily smoking compared with heterosexual service members. Daily smoking was the only disparity that remained after accounting for sociocultural environmental risk factors.
  - Bisexual service members had a higher likelihood of reporting probable depression, suicidal ideation, and suicide attempt and most of the substance use problems (i.e., hazardous drinking, current/daily smoking, e-cigarette use) relative to heterosexual service members. All the reported mental health disparities within this group remained significant until sociocultural environmental stressors and risk factors were added. This was also true for the group's reported hazardous drinking and current/daily smoking. Only the e-cigarette use disparity persisted after accounting for sociocultural environmental stressors and risk factors.

Military-Civilian Comparisons on Behavioral Health Outcomes

To compare the behavioral health outcomes of minority groups in DoD to the outcomes of their representative sociodemographically matched civilian counterparts, we used a propensity score matching approach, which allowed us to compare data from service members in the 2015 HRBS to the three nationally representative surveys of U.S. adults (the 2015 NSDUH, 2015 and 2016 BRFSS, and 2015 NHANES).

When compared with sociodemographically matched civilians, the U.S. military population overall is characterized by a greater prevalence of mental health problems (i.e., probable depression and suicidal behavior), but lower levels of substance (i.e., alcohol, tobacco, and marijuana) use except for smokeless tobacco. Key findings include the following:

- There is limited evidence that racial/ethnic minority groups in the military report greater behavioral health disparities than their matched civilian counterparts. There are a few exceptions. Relative to their white counterparts, racial/ethnic minority groups in the military are more likely to report suicide attempt suicide attempt (non-Hispanic blacks and Hispanics), heavy drinking (people of other races), and current smoking (Hispanics and non-Hispanic Asians) in contrast, racial/ethnic minority groups from the matched civilian sample were less likely to report these behavioral health outcomes. There are a few instances in which racial/ethnic minority groups in the military fared better relative to their matched civilian peers in terms of disparities (i.e., other-race service member report lower prevalence of suicide attempt and current smoking; non-Hispanic black service members have lower prevalence of binge drinking compared to non-Hispanic white service members).
- Gender disparities in the civilian world are mirrored in the military.
- Sexual minority groups both in the military and in the civilian population exhibit lower prevalence for smokeless tobacco use, but the protective effect is greater in the civilian population. Prevalence of heavy drinking is greater among sexual orientation minority groups in both the military and matched civilian group relative to their heterosexual peers but this disparity is even greater in the military.

Discussion and Policy Implications

Based on the results presented in this report, we offer three potential areas for DoD to address in the future. These policy implications are designed to aid DoD in further supporting the behavioral health of minority group service members.

Though there do not appear to be widespread behavioral health disparities among racial/ethnic minority service members, suicide attempt is an area of concern that warrants attention, particularly for non-Hispanic black, Hispanic, and non-Hispanic Asian military personnel. These minority groups had ORs, respectively, of being 1.76, 1.23, and 3.66 significantly more likely to have had a suicide attempt in the past 12 months, compared with their non-Hispanic white peers. Perceived racism and discrimination, family conflict, and alienation have been identified in the civilian literature as risk factors for suicide attempt among these minority groups (Cheng et al., 2010; Gomez et al., 2011; Joe et al., 2006; Zayas et al., 2010). Understanding whether these risk factors as well as other military specific factors (e.g., unit cohesion, leadership support) contribute to the observed racial/ethnic minority disparities in suicide attempt among military personnel would enable DoD to potentially better target suicide prevention efforts directed as these at-risk groups. Nonetheless, this study's findings should be considered in light of certain limitations that are more fully detailed in the subsequent Limitations section.

To support the behavioral health of female service members, efforts are most needed to address gender disparities in mental health outcomes. Consistent with prior studies, our findings indicate that female service members are more likely to report experiencing mental health conditions—for example, probable depression and suicide attempt (Bush et al., 2013; Luxton, Skopp, and Maguen, 2010; Gadermann et al., 2012; Naifeh et al., 2019) but report being and less likely to engage in problematic alcohol use or tobacco use (Brittany et al., 2017;

Chin et al., 2018; Defense Heath Agency, 2015; Eisen et al., 2012; Hall et al., 2018; Ulanday et al., 2017; Wooten et al., 2013). Although the constellation of factors thought to contribute to gender disparities in mental health outcomes are complex (as discussed in Chapter Two), recent studies indicate that female service members may disproportionately experience risk factors such as sexual harassment, gender-based discrimination, and low unit support (Breslin et al., 2019 Langdon et al., 2017; Street et al., 2013) that are linked to their differential risk for certain mental health problems. Further study is needed to explore these findings such as identifying which factors are contributing to gender disparities in mental health and, of those, which are within DoD's purview to act and intervene on.

Sexual orientation minority groups in the military suffer from the greatest behavioral health disparities and may benefit from targeted intervention. Certain sexual minority disparities (i.e., bisexual service members' greater likelihood to report probable depression, suicidal behavior, and current smoking; gay/lesbian service members' greater likelihood of current smoking) were no longer significant when sociocultural environmental risk factors were accounted for. This suggests potential areas DoD could target to reduce sexual minority disparities. However, other sexual minority disparities (i.e., bisexual service members' greater likelihood of e-cigarette use, gay/lesbian service members' greater likelihood of daily smoking) persisted even when accounting for sociocultural environmental risk factors. Moreover, the military-matched civilian comparisons revealed a disparity in both populations in which sexual orientation minorities reported higher levels of heavy drinking relative to their heterosexual peers and this disparity was greater in the military. A reserve disparity was also observed with sexual orientation groups in both the military and matched civilian population being less likely to report smokeless tobacco use relative to their heterosexual peers but this protective effect was smaller in the military. Additional study is warranted to assess whether minority stressors such as stigma, prejudice, and discrimination may account for unexplained sexual orientation disparities in behavioral health (Meyer, 2003; Goldbach and Gibbs, 2017; Wilson et al., 2016).

Limitations

As described above, this study relies on existing secondary data sources such as the 2015 HRBS, and this necessarily limits the types of behavioral health outcomes and sociocultural environmental risk factors that could be examined. Though this study includes risk factors such as sexual/physical abuse and social support, we were unable to assess whether observed behavioral health disparities are linked to stressors that are related to minority status, including discrimination based on race/ethnicity, gender, and sexual orientation. Further, we did not assess the impact of intersectional stigma (i.e., whether service members with multiple stigmatized identities or minority statuses are especially vulnerable to experiencing behavioral health disparities), nor did we investigate behavioral health disparities among transgender service members given the lack of sufficient sample sizes of these minority service groups. Several limitations were associated with the assessment of suicidal behavior in the military population. The 2015 HRBS asks about suicidal behavior "since joining the military"—a time frame that is likely to vary widely across respondents. Given that the 2015 HRBS did not assess respondents' length of military service, the analyses on suicidal behavior could not account for this varia-

tion. Moreover, prior suicide attempt is one of the strongest predictors of subsequent suicide attempt or death by suicide, and the study analyses did not account for suicidal behavior that may have occurred prior to joining the military. The low prevalence of suicidal behavior and relatively small sample sizes (particularly with respect to the sexual minority groups) may have limited the power to detect statistically significant differences and the precision of the point estimates. The true minority-majority group differences on suicide attempts could actually be smaller or larger. In addition, though single-item survey measures are often used to assess suicide attempt, it is unknown whether different groups may be referring to and counting different types of behavior when responding to the same question. Further, the prevalence of suicide attempts in the military was derived from a single administration of the HRBS in 2015. Subsequent study is warranted to assess whether this study's findings are replicated in more recent administrations of the HRBS. Using data from the DoD Suicide Event Report (DoDSER) system, Ursano et al. (2015) found evidence of reverse disparities among active duty Army soldiers during the years of 2004 to 2009. Controlling for sociodemographic characteristics, black, Hispanic, and Asian soldiers had lower odds of a suicide attempt relative to white soldiers. More recent records from the DoDSER system could also be used to verify whether there are similar patterns of racial/ethnic group disparities in suicide attempts. Existing DoDSER reports provide a breakdown of what proportion of the total number of suicide attempts in a given year are committed by different racial/ethnic groups. However, DoDSER data could be used to conduct formal comparisons on the prevalence of suicide attempts between racial/ethnic groups. Another study limitation is that the 2015 HRBS does not collect data on suicide deaths, but the DoDSER does and could conduct formal racial/ethnic group comparisons not only on suicide attempts but also on suicide deaths.

Other features of the secondary data sources should be taken into account when considering the study findings. Gender was assessed by asking respondents whether they identify as male or female making it unclear whether respondents were referring to their gender or biological sex. Screening instruments used to establish probable diagnoses for certain mental disorders and substance misuse were employed by the surveys instead of structured clinical diagnostic interviews. All data were self-report and different survey administration modes were applied across the 2015 HRBS (anonymous web survey), NSDUH (in-person computer-assisted interview), and BRFSS (computer-assisted telephone interview). It should also be noted that the findings are correlational in nature and did not account other potential related factors (e.g., historical and political events that occurred during the data collection period).

As in the civilian population, racial/ethnic minority service members experience only a few disparities with respect to the prevalence of behavioral health problems. However, racial/ethnic minorities in the civilian population are known to experience more chronic and disabling courses of illness. Even though racial/ethnic minority groups in the military do not experience a greater risk across a variety of behavioral health outcomes, it is unknown whether they experience similarly more severe courses of illness. We were unable to examine whether there are significant minority group disparities in behavioral health related disability and impairment, which is critically tied to force readiness. Finally, though the set of stressors and risk factors included in this study is able to account for some of the observed minority group behavioral health disparities, insufficient sample sizes prohibit us from examining which specific factors have the strongest explanatory power.

Conclusion

To better understand the behavioral health needs of minority groups in the services, this report identifies areas in which significant disparities exist and where efforts may be targeted. However, it is equally as important to remember that even when disparities do exist, they are not automatically indicative of decreased performance or that the disadvantage groups are somehow unfit for serving in our nation's military. Prevention programs and behavioral health care treatments that address the broad spectrum of needs represented in today's military will ensure optimal readiness for the men and women who serve.

APPENDIX A

Methodology

This study sought to improve DoD's understanding of the behavioral health needs of minority service members, defined as racial/ethnic minorities; women; and gay, lesbian, and bisexual service members. In this appendix we outline the methodology used to address the study's two primary research aims:

1. to examine whether observed minority group differences across a variety of behavioral health outcomes are attenuated by sociodemographic, military, or risk factors
2. to compare the behavioral health outcomes of minority groups in DoD to the outcomes of their representative sociodemographically matched civilian counterparts.

Aim 1: Explaining Military Minority Group Differences in Behavioral Health Outcomes

Data and Sample

To address Aim 1, we utilize data from the 2015 HRBS (for more information, see Meadows et al., 2018). The HRBS is DoD's flagship self-reporting survey of the health and health behaviors of service members. The 2015 HRBS was conducted with active duty service members, who completed the survey online anonymously. The total sample size was 16,699, though the analytic sample size for the current study varies by outcome, as some data are missing. All models include a set of indicators for missing data on the predictors (described below in the "Measures" section).[1]

Measures

Outcomes

Minority group disparities were examined among four mental health outcomes (probable MDD, probable PTSD, suicidal ideation, and suicide attempt) and six substance use outcomes (binge drinking, hazardous drinking, current cigarette smoking, current daily cigarette smoking, current smokeless tobacco use, and current e-cigarette use).

[1] These indicators were a set of dummy variables that equaled 1 when the predictor in question was missing and 0 when it was not.

Mental Health

Probable MDD. Depression was measured using the PHQ-9, which assesses symptoms of depression in the past 2 weeks. Scores of 15 or higher in primary care samples correspond to probable depression and moderate to severe depression symptom severity (Kroenke, Spitzer, and Williams, 2001).

Suicidal Ideation Since Joining the Military. The 2015 HRBS asked service members if they had ever had thought about trying to kill themselves and, if so, whether they had those thoughts in the past year, since joining the military, before joining the military, and/or during a deployment. This analysis focuses on suicidal ideation since joining the military.

Suicide Attempts Since Joining the Military. The 2015 HRBS asked if service members had ever attempted to kill themselves. For those who said they had attempted suicide in the past, respondents were asked whether the attempt(s) happened in the past year, since joining the military, before joining the military, and/or during a deployment. This analysis focuses on suicidal ideation since joining the military.

Probable PTSD. PTSD in the past 30 days was measured using the PCL-C. The PCL is widely used in military PTSD studies, and the 2015 HRBS used the civilian version because it assesses PTSD symptoms related to all psychological traumas, not just those directly related to military service. A cut point of 50 was used to indicate probable PTSD (Weathers et al., 1993). A significant debate has surrounded the issue of PCL cut points in various settings and for various purposes. We chose a cut point of 50 because it is the cut point most often used in research performed in military population surveillance studies (e.g., Hoge et al., 2004), maximizing specificity and positive predictive value in this context (Bliese et al., 2008; Terhakopian et al., 2008).

Substance Use

Binge Drinking. The 2015 HRBS assessed binge drinking in the past month. Binge drinking is defined as having five or more drinks for men and four or more drinks for women on a single occasion. Having done so at least once in the past month resulted in a positive binge drinking indicator. This definition is identical to that used by the CDC in the BRFSS (Kanny et al., 2018).

Hazardous Drinking. Hazardous drinking was measured using AUDIT-C, which asks participants how often they had a drink containing alcohol, how many drinks they had on a typical day, and how often they had six or more drinks on a single occasion in the past 30 days (Bradley et al., 2006). For each question, participants chose from five choices, with each choice corresponding to a score (i.e., 0–4) that was summed across the three questions. Participants scoring 4 or higher for men and 3 or higher for women were used to indicate hazardous drinking (Bradley et al., 2006; Bradley et al., 2007; Bush et al., 1998).

Current Cigarette Smoking. The 2015 HRBS assessed cigarette/tobacco use by using items from the National Health Interview Survey (CDC, 2015b). Participants were first asked if they had ever smoked at least 100 cigarettes in their lifetime, and, if yes, how many cigarettes they had smoked in the past 30 days. If respondents indicated that they smoked at least one cigarette in the past 30 days, they were then asked if they currently (i.e., "now") smoke some days, every day, or not at all. Participants who gave a response other than "not at all" were considered current smokers.

Daily Cigarette Smoking. The 2015 HRBS assessed cigarette/tobacco use by using items from the National Health Interview Survey (CDC, 2015b). Participants were first asked if they

had ever smoked at least 100 cigarettes in their lifetime, and if yes, how many cigarettes they had smoked in the past 30 days. If respondents indicated that they smoked at least one cigarette in the past 30 days, they were then asked if they currently (i.e., "now") smoke some days, every day, or not at all. Those who gave a response that they were smoking "every day" were considered daily smokers.

Current Smokeless Tobacco Use. Participants in the 2015 HRBS were asked if they have ever used chewing tobacco or snuff, and if so, were asked if they had done so in the past 12 months. If they reported use of smokeless tobacco in the past 30 days, they were considered a current smokeless tobacco user.

Current E-Cigarette Use. Participants in the 2015 HRBS were asked if they ever used e-cigarettes and, if so, if they had used them within the past 30 days. Those who reported use in the past month were considered current e-cigarette users.

Predictors of Minority Disparities

Race/Ethnicity. Race/ethnicity is self-reported in the 2015 HRBS. Categories include non-Hispanic white (reference category), Non-Hispanic black, Hispanic, non-Hispanic Asian, other single race (e.g., American Indian/Alaska Native, Native Hawaiian/other Pacific Islander, other), and multiple races. If a respondent selected Hispanic as his or her ethnicity, he or she was categorized as Hispanic regardless of whether any additional race category was selected.

Gender. Respondents self-reported whether they were male (reference category) or female. Respondents may have been referring to biological sex or perceived gender identity when answering this question.[2]

Sexual Orientation. The 2015 HRBS used a single item to assess sexual orientation. Respondents indicated whether they were heterosexual (reference category), gay/lesbian, or bisexual. In an alternate model specification, bisexual was used as the reference category in order to access differences between gay/lesbian and bisexual respondents.

Age. Age is measured in categories based on years: 17–20, 21–23, 24–27, 28–34, and 35 and older (reference category).

Education. Education is measured using three categories: high school or less (reference category), some college, and college degree or higher.

Marital Status. Marital status is measured using four categories: married (reference category); single; cohabiting; and separated, divorced, or widowed.

Parental Status. Parental status is an indicator of whether or not the respondent has at least one child below the age of 18 in his or her household.

Service Branch. Service branch includes five indicators for each of the armed forces: Air Force, Army (reference category), Coast Guard, Marine Corps, and Navy.

Pay Grade. Pay grade is measure as five categories: junior enlisted (E1–E4), midgrade enlisted (E5–E6), senior enlisted (E7–E9) and warrant officers (W1–W5), junior officers (O1–O3), and midgrade officers (O4–O6; reference category). Officers above the rank of colonel (O7) were not included in the HRBS.

Length of Recent Deployment. Respondents in the 2015 HRBS indicated how many months, out of the 12 months prior to the survey, they had spent in a deployment. Response

[2] The 2015 HRBS did ask about transgender identity, but the sample size was too small to conduct analyses with this group.

options were categorical (less than one month, one to three months, four to six months, seven to nine months, ten to 12 months) but treated as continuous in the current analysis. A separate dichotomous indicator was used to denote respondents who had no deployment experience in the past year.

Lifetime Combat Trauma Exposure. Service members who had ever deployed (to include both combat and noncombat deployments) were asked to indicate whether they had experienced one or more of 18 different traumas. The list of experiences used in the current analysis is based on six of the 18 items in the 2015 HRBS. It includes only 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. For this analysis we measured combat exposure as a continuous sum of these six items.

Social Support. Perceived emotional support is accessed using the Patient-Reported Outcomes Measurement Information System (PROMIS) Emotional Support Form 4a. The four items in this scale are rated from 1 (never) to 5 (always) and ask respondents about availability of having someone to talk to, to listen to them, and who makes them feel appreciated. The analysis utilized *t*-scores as defined in the PROMIS documentation (HealthMeasures, undated).

Lifetime Physical Abuse. A dichotomous variable indicates whether respondents have ever, in their lifetime, been abused, punished, or beaten by a person in authority such that they received bruises, cuts, welts, lumps, or other injuries.

Lifetime Unwanted Sexual Contact. A dichotomous variable indicates whether respondents have ever, in their lifetime, experienced any sexual contact that was unwanted, against their will, or occurred when the respondent did not or could not consent (for example, unwanted sexual touching or oral, anal, or vaginal penetration).

Financial Stress. A single item in the 2015 HRBS asks respondents to rate their financial condition over the past 12 months: very comfortable and secure, able to make ends meet without much difficulty, occasionally have some difficulty making ends meet, tough to make ends meet but keeping my head above water, and in over my head. This item is treated as continuous in the current analysis.

Alcohol Norms and Beliefs. Respondents' perceptions of military drinking culture were assessed using a seven-item scale. Each item is rated on a scale from 1 (strongly disagree) to 5 (strongly agree), and the average scale score is used in the current analysis. Items include it's hard to "fit in" in my command if you don't drink; drinking is part of being in my unit; drinking is part of being in the military; drinking is just about the only recreation available at my installation; leadership is tolerant of off-duty alcohol intoxication or drunkenness; drinking to the point of losing control is acceptable; and, others in my pay grade at this installation believe drinking to the point of losing control is acceptable. The alcohol norms and beliefs scale is included only in models using an alcohol-related outcome (i.e., binge drinking and hazardous alcohol use).

The following tables provide overview descriptives (Table A.1), as well as descriptives by subgroup: race/ethnicity (Table A.2), gender (Table A.3), and sexual orientation (Table A.4).

Table A.1
2015 Health Related Behaviors Survey Sample Description

	Unweighted Number	Weighted Percent
Race/Ethnicity		
Non-Hispanic white	10,791	57.9
Non-Hispanic black	1,599	11.3
Hispanic	2,083	16.5
Non-Hispanic Asian	596	5.0
Other single race	729	3.9
Multiple races	864	5.2
Missing race	37	0.2
Gender		
Male	10,368	84.4
Female	6,331	15.6
Sexual orientation		
Heterosexual	13,542	78.3
Gay/Lesbian	424	2.2
Bisexual	439	2.6
Missing sexual orientation	2,294	16.9

SOURCE: 2015 HRBS.

Table A.2
Sample Descriptives: Race/Ethnicity

	Non-Hispanic White (% or mean)	Non-Hispanic Black (% or mean)	Hispanic (% or mean)	Non-Hispanic Asian (% or mean)	Other Single Race (% or mean)	Multiple Races (% or mean)
Individual Characteristics						
Age						
17–20 years	6.3	7.2	12.4	3.8	5.9	4.7
21–23 years	17.6	10.9	20.8	11.9	13.4	19.9
24–27 years	18.4	17.6	19.9	19.8	14.0	22.6
28–34 years	29.4	25.5	23.6	32.7	25.0	25.4
35+ years	28.3	38.7	23.3	31.8	41.8	27.6
Education						
High school or less	19.8	18.0	26.3	13.8	21.6	20.9
Some college	46.1	52.5	55.1	40.6	52.1	51.0
College degree or higher	34.2	29.5	18.6	45.7	26.3	28.1
Marital Status						
Married	59.9	55.9	50.2	48.4	62.3	58.4
Single	29.9	31.7	40.4	42.1	22.1	30.0
Cohabiting	3.4	2.1	2.4	1.5	2.0	5.3
Separated, divorced, or widowed	6.8	10.2	7.0	8.0	13.6	6.3
Parental Status[a]	41.0	47.0	34.8	33.6	49.6	39.4
Service Branch						
Air Force	25.0	17.9	17.1	16.2	19.6	23.8
Army	34.2	49.2	41.7	43.9	37.9	27.5
Marine Corps	13.8	9.3	17.9	9.6	16.2	16.9
Navy	23.5	22.7	20.8	29.5	22.3	28.2
Coast Guard	3.6	0.9	2.5	0.9	4.0	3.7
Military Characteristics						
Pay Grade						
E1–E4	41.1	42.7	54.0	55.2	37.1	46.0
E5–E6	28.1	31.7	28.4	27.7	36.2	32.6
E7–E9, W1–W5	10.3	17.7	9.9	5.5	14.5	8.0
O1–O3	12.3	4.8	5.5	7.1	6.0	9.2
O4–O6	8.2	3.2	2.2	4.5	6.2	4.2

Table A.2—Continued

	Non-Hispanic White (% or mean)	Non-Hispanic Black (% or mean)	Hispanic (% or mean)	Non-Hispanic Asian (% or mean)	Other Single Race (% or mean)	Multiple Races (% or mean)
Months of Deployment in Past Year[b]	1.0	1.2	1.1	1.0	1.2	1.1
Never Deployed	0.4	0.3	0.5	0.5	0.3	0.4
Stressors/Risk Factors						
Lifetime combat trauma exposure[c]	0.6	0.6	0.5	0.3	0.6	0.6
Social support[d]	53.3	52.6	52.0	51.6	51.7	52.1
Lifetime physical abuse[e]	0.1	0.1	0.1	0.1	0.2	0.2
Lifetime unwanted sexual contact[f]	0.2	0.2	0.2	0.1	0.2	0.2
Financial stress[g]	1.1	1.0	1.0	0.9	1.2	1.3
Alcohol norms and beliefs[h]	1.7	1.6	1.7	1.6	1.7	1.7

SOURCE: 2015 HRBS.

NOTES: All data are weighted.

[a] An indicator of whether or not the respondent has at least one child below the age of 18 in his or her household.

[b] The number of months out of the 12 months prior to the survey the respondent had spent in a deployment. Response options were categorical (less than one month [0], one to three months [1], four to six months [2], seven to nine months [3], ten to 12 months [4]) but treated as continuous. The mean is presented in the table.

[c] The mean number of 18 possible traumatic exposures experienced by respondents who had ever deployed.

[d] The mean *t*-score on the PROMIS Emotional Support Form 4a.

[e] An indicator of whether respondents have ever, in their lifetime, been abused, punished, or beaten by a person in authority such that they received bruises, cuts, welts, lumps, or other injuries.

[f] An indicator of whether respondents have ever, in their lifetime, experienced any sexual contact that was unwanted, against their will, or occurred when the respondent did not or could not consent.

[g] A respondent's report of financial condition over the past 12-months, on a five-point scale: very comfortable and secure (4), able to make ends meet without much difficulty (3), occasionally have some difficulty making ends meet (2), tough to make ends meet but keeping my head above water (1), and in over my head (0). This item is treated as continuous in the current analysis. Mean is presented in the table.

[h] The average of a seven-item scale. Response options range from strongly disagree (1) to strongly agree (5) with higher scores indicating stronger acceptance of norms and beliefs.

Table A.3
Sample Descriptives: Gender

	Male (% or mean)	Female (% or mean)
Individual Characteristics		
Age		
17–20 years	7.2	7.0
21–23 years	17.0	17.0
24–27 years	17.9	23.0
28–34 years	27.7	28.3
35+ years	30.2	24.6
Education		
High school or less	21.8	13.1
Some college	48.1	51.0
College degree or higher	30.1	35.9
Marital Status		
Married	58.8	49.3
Single	32.3	31.0
Cohabiting	2.7	5.1
Separated, divorced, or widowed	6.3	14.6
Parental Status[a]	41.5	34.9
Service Branch		
Air Force	21.3	27.7
Army	37.8	34.6
Marine Corps	15.3	7.0
Navy	22.6	27.8
Coast Guard	3.0	2.9
Military Characteristics		
Pay Grade		
E1–E4	43.8	46.2
E5–E6	29.4	27.3
E7–E9, W1–W5	11.4	8.1
O1–O3	9.2	12.5
O4–O6	6.3	5.9
Length of Recent Deployment[b]	1.1	0.8
Never Deployed	0.4	0.5

Table A.3—Continued

	Male (% or mean)	Female (% or mean)
Stressors/Risk Factors		
Lifetime combat trauma exposure[c]	0.6	0.3
Social support[d]	52.6	53.8
Lifetime physical abuse[e]	0.1	0.2
Lifetime unwanted sexual contact[f]	0.1	0.5
Financial stress[g]	1.1	1.0
Alcohol norms and beliefs[h]	1.7	1.6

SOURCE: 2015 HRBS.

NOTES: All data are weighted.

[a] An indicator of whether or not the respondent has at least one child below the age of 18 in his or her household.

[b] The number of months out of the 12 months prior to the survey respondent had spent in a deployment. Response options were categorical (less than one month [0], one to three months [1], four to six months [2], seven to nine months [3], ten to 12 months [4]) but treated as continuous. The mean is presented in the table.

[c] The mean number of 18 possible traumatic exposures experienced by respondents who had ever deployed.

[d] The mean *t*-score on the PROMIS Emotional Support Form 4a.

[e] An indicator of whether respondents have ever, in their lifetime, been abused, punished, or beaten by a person in authority such that they received bruises, cuts, welts, lumps, or other injuries.

[f] An indicator of whether respondents have ever, in their lifetime, experienced any sexual contact that was unwanted, was against their will, or occurred when the respondent did not or could not consent.

[g] A respondent's report of financial condition over the past 12 months on five-point scale: very comfortable and secure (4), able to make ends meet without much difficulty (3), occasionally have some difficulty making ends meet (2), tough to make ends meet but keeping my head above water (1), and in over my head (0). This item is treated as continuous in the current analysis. The mean is presented in the table.

[h] The average of a seven-item scale. Response options range from strongly disagree (1) to strongly agree (5) with higher scores indicating stronger acceptance of norms and beliefs.

Table A.4
Sample Descriptives: Sexual Orientation

	Heterosexual (% or mean)	Gay/Lesbian (% or mean)	Bisexual (% or mean)
Individual Characteristics			
Age			
17–20 years	6.7	4.8	23.0
21–23 years	15.9	23.8	17.9
24–27 years	17.6	33.0	23.8
28–34 years	28.4	23.1	24.0
35+ years	31.4	15.3	11.3
Education			
High school or less	19.5	12.6	29.2
Some college	47.2	62.2	52.8
College degree or higher	33.2	25.2	18.0
Marital Status			
Married	60.0	27.7	35.7
Single	29.6	57.8	49.7
Cohabiting	2.9	6.7	5.9
Separated, divorced, or widowed	7.5	7.9	8.8
Parental Status[a]	43.0	4.3	22.8
Service Branch			
Air Force	38.3	31.7	35.4
Army	22.3	41.6	27.3
Marine Corps	22.3	18.0	20.1
Navy	14.0	5.6	14.8
Coast Guard	3.2	3.2	2.5
Military Characteristics			
Pay Grade			
E1–E4	42.2	59.1	58.1
E5–E6	28.8	22.5	27.4
E7–E9, W1–W5	11.6	4.8	5.8
O1–O3	10.5	9.3	6.8
O4–O6	7.0	4.3	2.0
Length of Recent Deployment[b]	1.1	0.9	0.6
Never Deployed	0.4	0.6	0.6

Table A.4—Continued

	Heterosexual (% or mean)	Gay/Lesbian (% or mean)	Bisexual (% or mean)
Stressors/Risk Factors			
Lifetime combat trauma exposure[c]	0.6	0.3	0.5
Social support[d]	53.1	53.7	49.2
Lifetime physical abuse[e]	0.1	0.2	0.2
Lifetime unwanted sexual contact[f]	0.2	0.4	0.5
Financial stress[g]	1.1	1.3	1.2
Alcohol norms and beliefs[h]	1.7	1.7	1.8

SOURCE: 2015 HRBS.

NOTES: All data are weighted.

[a] An indicator of whether or not the respondent has at least one child below the age of 18 in his or her household.

[b] The number of months out of the 12 months prior to the survey the respondent had spent in a deployment. Response options were categorical (less than one month [0], one to three months [1], four to six months [2], seven to nine months [3], ten to 12 months [4]) but treated as continuous. The mean is presented in the table.

[c] The mean number of 18 possible traumatic exposures experienced by respondents who had ever deployed.

[d] The mean *t*-score on the PROMIS Emotional Support Form 4a.

[e] An indicator of whether respondents have ever, in their lifetime, been abused, punished, or beaten by a person in authority such that they received bruises, cuts, welts, lumps, or other injuries.

[f] An indicator of whether respondents have ever, in their lifetime, experienced any sexual contact that was unwanted, was against their will, or occurred when the respondent did not or could not consent.

[g] A respondent's report of financial condition over the past 12 months on a five-point scale: very comfortable and secure (4), able to make ends meet without much difficulty (3), occasionally have some difficulty making ends meet (2), tough to make ends meet but keeping my head above water (1), and in over my head (1=0). This item is treated as continuous in the current analysis. The mean is presented in the table.

[h] The average of a seven-item scale. Response options range from strongly disagree (1) to strongly agree (5) with higher scores indicating stronger acceptance of norms and beliefs.

Analysis

This analysis was designed to assess the extent to which possible minority group differences in a set of behavioral health indicators could be explained by various factors using a regression-based approach. We began by describing the association between minority status—race/ethnicity, gender, and sexual orientation—and the outcome in question in a bivariate model, with no covariates (Model 1, unadjusted OR). Starting with Model 2, we sequentially introduced the explanatory factors into a logistic regression model in the following order:

- **Model 2: Minority Membership.** Unlike Model 1, this model includes indicators for all of the minority memberships, including race/ethnicity, gender, and sexual orientation, at the same time.
- **Model 3: Individual Characteristics.** In addition to the covariates in Model 2, Model 3 also includes indicators for age, education, marital status, parental status, and service branch.
- **Model 4: Military Experiences.** In addition to the covariates in Model 3, Model 4 includes indicators for pay grade and the time service members spent in deployment over the 12 months prior to the survey.
- **Model 5: Stressors/Risk Factors.** In addition to the covariates in Model 4, Model 5 includes indicators for the lifetime number of combat trauma events experienced by the service member, perceived emotional social support, lifetime experience with physical abuse, lifetime unwanted sexual contact, financial stress, and alcohol norms and beliefs (only in models where an alcohol-related behavior is the outcome).

All analyses use the original weights produced from the 2015 HRBS. In Chapter Three, only results for each of the racial/ethnic, gender, and sexual orientation categories are presented. In Tables 3.1–3.10, the first column contains the unadjusted ORs (Model 1, Bivariate); the subsequent columns contain adjusted ORs using the corresponding covariates for each model. For example, in Individual Characteristics (Model 3), the adjusted ORs for each of the racial/ethnic, gender, and sexual orientation categories include covariates for Minority Membership (Model 2; i.e., race/ethnicity, gender, and sexual orientation) and Individual Characteristics (Model 3; i.e., age, education, marital status, parental status, and service branch). Below, full model results (from Stressors/Risk factors, Model 5) are presented in Table A.5 for mental health outcomes and in Table A.6 for substance use outcomes; results from Models 2–4 are available from the authors.

Table A.5
Adjusted Odds Ratios from Model 5: Mental Health Outcomes

	Probable MDD	Suicidal Ideation	Suicide Attempt	Probable PTSD
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Minority Membership				
Race/Ethnicity				
Non-Hispanic white	REF	REF	REF	REF
Non-Hispanic black	0.75 (0.50–1.14)	0.53 (0.35–0.80)	2.46 (1.18–5.11)	1.45 (0.93–2.25)
Hispanic	0.92 (0.62–1.38)	0.47 (0.33–0.67)	1.12 (0.56–2.24)	1.02 (0.65–1.58)
Non-Hispanic Asian	0.95 (0.44–2.03)	0.90 (0.48–1.69)	5.40 (2.53–11.53)	0.77 (0.30–1.96)
Other single race	1.25 (0.69–2.26)	0.75 (0.42–1.35)	0.91 (0.17–4.77)	1.82 (0.91–3.63)
Multiple races	1.10 (0.66–1.82)	0.96 (0.62–1.48)	1.04 (0.49–2.21)	1.05 (0.63–1.75)
Gender				
Male	REF	REF	REF	REF
Female	1.46 (1.08–1.96)	0.97 (0.76–1.23)	1.31 (0.80–2.14)	1.27 (0.92–1.77)
Sexual Orientation				
Heterosexual	REF	REF	REF	REF
Gay/lesbian	0.72 (0.39–1.35)	1.55 (0.87–2.76)	2.00 (0.63–6.32)	0.71 (0.34–1.46)
Bisexual	1.41 (0.79–2.53)	1.63 (1.00–2.67)	1.82 (0.86–3.85)	1.00 (0.58–1.73)
Individual Characteristics				
Age				
17–20 years	0.85 (0.36–2.00)	1.34 (0.62–2.90)	2.16 (0.43–10.76)	0.56 (0.22–1.39)
21–23 years	1.06 (0.54–2.11)	1.29 (0.73–2.31)	3.55 (1.19–10.63)	0.60 (0.30–1.21)
24–27 years	1.16 (0.68–1.96)	1.12 (0.71–1.76)	1.35 (0.47–3.82)	0.87 (0.47–1.61)
28–34 years	1.08 (0.73–1.60)	0.99 (0.71–1.37)	0.69 (0.34–1.43)	1.06 (0.70–1.61)
35+ years	REF	REF	REF	REF

Table A.5—Continued

	Probable MDD	Suicidal Ideation	Suicide Attempt	Probable PTSD
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Education				
High school or less	REF	REF	REF	REF
Some college	1.27 (0.85–1.90)	1.00 (0.68–1.46)	0.80 (0.46–1.39)	0.97 (0.65–1.46)
College degree or higher	0.84 (0.49–1.45)	1.14 (0.69–1.86)	1.15 (0.56–2.35)	0.81 (0.46–1.42)
Marital Status				
Married	REF	REF	REF	REF
Single	0.89 (0.60–1.34)	0.91 (0.63–1.30)	1.36 (0.63–2.92)	0.80 (0.50–1.29)
Cohabiting	1.30 (0.69–2.44)	0.98 (0.53–1.80)	1.94 (0.58–6.45)	0.84 (0.42–1.66)
Separated, divorced, or widowed	1.18 (0.81–1.73)	1.44 (1.02–2.03)	2.78 (1.34–5.74)	1.05 (0.70–1.59)
Parental Status	1.00 (0.70–1.42)	0.86 (0.64–1.15)	1.87 (1.02–3.42)	0.83 (0.58–1.18)
Service Branch				
Army	REF	REF	REF	REF
Air Force	0.49 (0.33–0.72)	0.54 (0.40–0.72)	0.63 (0.33–1.19)	0.76 (0.50–1.13)
Marine Corps	1.39 (0.92–2.11)	0.87 (0.60–1.26)	1.60 (0.89–2.86)	1.15 (0.75–1.74)
Navy	0.94 (0.64–1.37)	0.82 (0.60–1.14)	1.04 (0.55–1.96)	1.40 (0.94–2.11)
Coast Guard	0.56 (0.39–0.80)	0.57 (0.43–0.76)	0.53 (0.29–0.98)	0.82 (0.56–1.22)
Military Experiences				
Pay Grade				
E1–E4	2.49 (1.30–4.78)	1.17 (0.65–2.13)	3.78 (0.97–14.71)	3.81 (1.84–7.90)
E5–E6	1.87 (1.08–3.25)	1.66 (1.03–2.66)	5.98 (2.13–16.75)	1.67 (0.94–2.96)
E7–E9, W1–W5	1.58 (0.97–2.59)	1.62 (1.15–2.29)	4.10 (1.55–10.82)	1.98 (1.20–3.27)
O1–O3	1.87 (1.17–2.97)	1.41 (1.00–2.00)	3.30 (1.19–9.12)	2.01 (1.21–3.32)
O4–O6	REF	REF	REF	REF
Length of Recent Deployment	1.06 (1.01–1.12)	0.98 (0.94–1.02)	0.98 (0.92–1.05)	1.04 (0.99–1.10)

Table A.5—Continued

	Probable MDD	Suicidal Ideation	Suicide Attempt	Probable PTSD
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Stressors/ Risk Factors				
Lifetime combat trauma exposure	1.31 (1.17–1.46)	1.12 (1.03–1.23)	1.22 (1.02–1.47)	1.61 (1.43–1.80)
Social support	0.93 (0.92–0.94)	0.95 (0.94–0.96)	0.96 (0.95–0.98)	0.95 (0.93–0.96)
Lifetime physical abuse	1.61 (1.14–2.28)	2.23 (1.68–2.97)	1.41 (0.80–2.48)	2.59 (1.84–3.64)
Lifetime unwanted sexual contact	1.41 (0.97–2.04)	1.94 (1.46–2.59)	1.19 (0.73–1.93)	1.72 (1.16–2.56)
Financial stress	1.82 (1.57–2.11)	1.24 (1.09–1.41)	1.55 (1.16–2.05)	1.76 (1.51–2.06)

NOTES: All models include indicators for missing data on the predictor variables which are omitted from the output shown in this table.

CI = 95% confidence interval; REF = reference category.

Table A.6
Adjusted Odds Ratios from Model 5: Substance Use Outcomes

	Binge Drinking	Hazardous Drinking	Current Cigarette Use	Daily Smoking	Current Smokeless Tobacco Use	Current E-Cigarette Use
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Minority Memberships						
Race/Ethnicity						
Non-Hispanic white	REF	REF	REF	REF	REF	REF
Non-Hispanic black	0.54 (0.40–0.72)	0.39 (0.30–0.50)	0.47 (0.32–0.70)	0.36 (0.22–0.59)	0.24 (0.13–0.44)	0.78 (0.52–1.18)
Hispanic	0.91 (0.72–1.15)	0.70 (0.57–0.88)	0.82 (0.58–1.15)	0.45 (0.28–0.74)	0.48 (0.33–0.70)	1.05 (0.75–1.49)
Non-Hispanic Asian	0.56 (0.36–0.87)	0.36 (0.24–0.56)	0.90 (0.53–1.53)	0.73 (0.38–1.40)	0.07 (0.02–0.27)	0.71 (0.39–1.28)
Other single race	0.87 (0.57–1.34)	0.67 (0.46–0.98)	0.83 (0.49–1.39)	0.65 (0.34–1.24)	0.58 (0.32–1.05)	0.83 (0.44–1.60)
Multiple races	0.90 (0.66–1.24)	0.86 (0.63–1.16)	1.06 (0.69–1.62)	0.80 (0.48–1.36)	0.69 (0.40–1.20)	1.14 (0.73–1.78)
Gender						
Male	REF	REF	REF	REF	REF	REF
Female	0.64 (0.54–0.75)	0.78 (0.67–0.91)	0.80 (0.63–1.02)	0.97 (0.69–1.35)	0.14 (0.10–0.21)	0.53 (0.40–0.69)
Sexual Orientation						
Heterosexual	REF	REF	REF	REF	REF	REF
Gay/lesbian	1.41 (0.89–2.24)	1.33 (0.84–2.09)	1.77 (0.89–3.51)	3.15 (1.35–7.35)	0.38 (0.18–0.82)	0.69 (0.35–1.36)
Bisexual	1.27 (0.83–1.93)	1.29 (0.86–1.94)	1.70 (0.94–3.07)	1.62 (0.88–3.00)	1.49 (0.65–3.45)	2.52 (1.50–4.25)
Individual Characteristics						
Age						
17–20 years	0.45 (0.26–0.76)	0.68 (0.41–1.11)	0.46 (0.23–0.90)	0.48 (0.20–1.14)	0.69 (0.33–1.44)	3.24 (1.75–5.99)
21–23 years	2.34 (1.65–3.33)	2.89 (2.04–4.07)	0.83 (0.50–1.38)	0.65 (0.34–1.24)	1.91 (1.10–3.32)	2.95 (1.77–4.93)
24–27 years	1.65 (1.24–2.20)	1.88 (1.42–2.48)	0.67 (0.43–1.06)	0.45 (0.25–0.79)	1.31 (0.81–2.11)	2.88 (1.85–4.47)
28–34 years	1.85 (1.47–2.31)	2.05 (1.66–2.53)	0.91 (0.65–1.29)	0.73 (0.48–1.09)	1.04 (0.72–1.51)	1.38 (0.94–2.03)
35+ years	REF	REF	REF	REF	REF	REF

Table A.6—Continued

	Binge Drinking	Hazardous Drinking	Current Cigarette Use	Daily Smoking	Current Smokeless Tobacco Use	Current E-Cigarette Use
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Education						
High school or less	REF	REF	REF	REF	REF	REF
Some college	0.80 (0.63–1.02)	1.05 (0.82–1.34)	0.54 (0.40–0.71)	0.44 (0.31–0.61)	0.66 (0.48–0.90)	0.87 (0.64–1.19)
College degree or higher	0.75 (0.54–1.04)	0.87 (0.63–1.20)	0.34 (0.22–0.53)	0.23 (0.13–0.40)	0.53 (0.33–0.87)	0.31 (0.19–0.50)
Marital Status						
Married	REF	REF	REF	REF	REF	REF
Single	1.66 (1.32–2.08)	1.40 (1.13–1.74)	1.75 (1.24–2.46)	1.46 (0.93–2.28)	1.03 (0.73–1.45)	1.19 (0.86–1.64)
Cohabiting	1.54 (1.07–2.21)	1.93 (1.35–2.75)	1.78 (1.08–2.95)	1.73 (0.89–3.38)	0.74 (0.39–1.42)	1.32 (0.77–2.26)
Separated, divorced, or widowed	1.59 (1.21–2.07)	1.46 (1.14–1.87)	1.32 (0.91–1.92)	1.26 (0.79–2.01)	1.33 (0.85–2.06)	1.63 (1.07–2.50)
Parental Status	0.71 (0.59–0.86)	0.67 (0.56–0.79)	1.14 (0.85–1.53)	1.11 (0.76–1.62)	0.85 (0.63–1.14)	0.99 (0.73–1.36)
Service Branch						
Army	REF	REF	REF	REF	REF	REF
Air Force	0.58 (0.47–0.71)	0.58 (0.48–0.71)	0.55 (0.41–0.74)	0.52 (0.35–0.77)	0.59 (0.43–0.81)	0.74 (0.53–1.04)
Marine Corps	1.43 (1.12–1.83)	1.50 (1.18–1.91)	1.01 (0.72–1.42)	0.92 (0.58–1.45)	1.42 (1.01–1.99)	0.81 (0.54–1.22)
Navy	1.14 (0.91–1.42)	1.10 (0.89–1.36)	0.69 (0.50–0.95)	0.74 (0.49–1.12)	0.80 (0.56–1.15)	1.04 (0.72–1.50)
Coast Guard	1.12 (0.92–1.35)	0.93 (0.77–1.11)	0.47 (0.35–0.62)	0.46 (0.32–0.67)	0.61 (0.46–0.82)	0.68 (0.49–0.94)
Military Experiences						
Pay Grade						
E1–E4	0.57 (0.40–0.82)	0.31 (0.22–0.44)	5.18 (2.63–10.18)	5.56 (2.37–13.00)	1.60 (0.82–3.11)	2.78 (1.29–6.00)
E5–E6	0.68 (0.50–0.94)	0.38 (0.28–0.51)	5.05 (2.86–8.92)	6.03 (2.82–12.88)	1.74 (1.04–2.90)	2.67 (1.29–5.55)
E7–E9, W1–W5	0.93 (0.73–1.20)	0.64 (0.51–0.80)	4.48 (2.74–7.35)	6.24 (3.13–12.43)	1.22 (0.81–1.84)	2.63 (1.33–5.20)
O1–O3	0.84 (0.67–1.04)	0.57 (0.46–0.70)	1.83 (1.09–3.07)	1.82 (0.88–3.79)	1.05 (0.72–1.55)	1.27 (0.65–2.49)
O4–O6	REF	REF	REF	REF	REF	REF

Table A.6—Continued

	Binge Drinking	Hazardous Drinking	Current Cigarette Use	Daily Smoking	Current Smokeless Tobacco Use	Current E-Cigarette Use
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Length of Recent Deployment	1.01 (0.98–1.04)	1.00 (0.97–1.03)	1.02 (0.98–1.07)	1.07 (1.01–1.13)	1.01 (0.97–1.06)	1.00 (0.95–1.05)
Stressors/Risk Factors						
Lifetime combat trauma exposure	1.04 (0.96–1.12)	1.04 (0.97–1.12)	0.94 (0.84–1.04)	0.94 (0.83–1.08)	1.14 (1.04–1.26)	0.83 (0.72–0.95)
Social support	1.00 (1.00–1.01)	1.00 (1.00–1.01)	1.00 (0.99–1.01)	1.00 (0.98–1.01)	1.02 (1.01–1.03)	1.02 (1.01–1.03)
Lifetime physical abuse	1.11 (0.86–1.43)	1.48 (1.17–1.87)	1.29 (0.94–1.76)	1.08 (0.72–1.64)	0.77 (0.53–1.12)	1.44 (1.01–2.07)
Lifetime unwanted sexual contact	1.09 (0.86–1.37)	1.10 (0.89–1.36)	1.13 (0.82–1.57)	1.43 (0.91–2.24)	0.91 (0.61–1.36)	1.10 (0.76–1.57)
Financial stress	1.13 (1.04–1.24)	1.21 (1.11–1.31)	1.35 (1.20–1.53)	1.45 (1.25–1.69)	1.17 (1.03–1.33)	1.31 (1.16–1.49)
Alcohol norms and beliefs	1.57 (1.34–1.85)	1.59 (1.36–1.85)	N/A	N/A	N/A	N/A

NOTES: All models include indicators for missing data on the predictor variables which are omitted from the output shown in this table.

CI = 95% confidence interval; REF = reference category.

N/A = Not applicable in model specification.

Aim 2: Assessing Minority Group Differences in Behavioral Health Between the Military and Sociodemographically Matched Civilians

To address Aim 2, we use a propensity score matching approach, where we use data from civilians and "match" them to active duty service members in the 2015 HRBS based on a set of sociodemographic characteristics.

Data and Sample

Data for active duty military personnel come from the 2015 HRBS (described above). Data for the matched civilian sample come from four surveys: the 2015 NSDUH, 2015 and 2016 BRFSS, and 2015 NHANES. These surveys were selected because they are nationally representative of U.S. adults, contain the sociodemographic characteristics needed for the matching process, and contain identical outcomes to the 2015 HRBS. As noted below, some outcomes are available in more than one civilian survey.

The 2015 NSDUH has been used since 1971 to collect information on tobacco, alcohol, and drug use, mental health, and other health-related issues among U.S. adults (National Survey on Drug Use and Health, undated). It is conducted annually and at the latest iteration surveyed some 70,000 individuals. Participants take the survey on a laptop computer provided by the interviewer.

The 2015 and 2016 BRFSS is a telephone survey of U.S. adults that collects information about health and health-related behaviors (CDC, undated a). The most recent iteration includes data from all 50 states, the District of Columbia, and three U.S. territories. Roughly 400,000 adults complete the survey each year; however, individual topics (called modules) are state-specific (i.e., not every state uses the same set of modules). We primarily rely on the 2015 BRFSS; however, marijuana use and e-cigarette use were not covered in that year but are available in the 2016 BRFSS. Also note that the BRFSS does not contain data on sexual orientation.

The 2013–2014 and 2015–2016 NHANES assess the health and nutrition of U.S. adults and children (CDC, undated b). Though the NHANES contains both an interview and survey portion, we utilize only survey data. Every year, roughly 7,000 U.S. residents are randomly selected to participate. We combine two surveys to increase the sample size.

Measures

Outcomes

Mental Health

Probable MDD. Both the 2015 HRBS and the 2015 NHANES use the PHQ-9 to assess probable major depression. Scores of 15 in primary care samples correspond to probable depression and moderate to severe depression symptom severity (Kroenke, Spitzer, and Williams, 2001). The PHQ-9 is available in both the 2015 HRBS and in the 2015 NHANES.

Suicidal Ideation in the Past 12 Months. Both the 2015 HRBS and the 2015 NSDUH asked respondents if they had had seriously thought about trying to kill themselves in the past 12 months.

Suicide Attempt in the Past 12 Months. Both the 2015 HRBS and the 2015 NSDUH asked if respondents had ever attempted to kill themselves in the past 12 months.

Substance Use

Binge Drinking. The 2015 HRBS, 2015 NSDUH, and 2015 BRFSS all contain items about binge drinking. All three surveys define binge drinking as having five or more drinks for men and four or more drinks for women on a single occasion. Across all surveys, having done so at least once in the past month resulted in a positive binge drinking indicator. This definition is identical to that used by the CDC in the BRFSS (CDC, 2012).

Heavy Drinking. The 2015 HRBS, 2015 NSDUH, and 2015 BRFSS all contain items about heavy drinking. Heavy drinking was defined as binge drinking (i.e., five or more drinks for men and four or more drinks for women on a single occasion) at least four times in the past 30 days.

Current Cigarette Smoking. The 2015 HRBS, 2015 NSDUH, and 2015 BRFSS all contain items about current cigarette use. However, differences between the NSDUH and the BRFSS required two versions of this outcome variable.

The first version of this outcome compares the 2015 HRBS and the 2015 NSDUH. The 2015 HRBS assessed cigarette/tobacco use by using items from the National Health Interview Survey (CDC, 2015b). Respondents were first asked if they had ever smoked at least 100 cigarettes in their lifetime, and, if so, how many cigarettes they had smoked in the past 30 days. If respondents reported smoking at least one cigarette in the past 30 days, they were considered a current smoker. Similarly, the NSDUH asked respondents if they had smoked any portion of a cigarette in the past 30 days. Current smokers were thus defined as individuals who have smoked at least part of one cigarette in the past 30 days.

The second version of this outcome compares the 2015 HRBS and the 2015 BRFSS. Items on the 2015 BRFSS are similar to those on the 2015 HRBS, but do not include the question about how many cigarettes the respondent has smoked in the past 30 days. For both the HRBS and the BRFSS, all respondents who indicate smoking at least 100 cigarettes are asked if they "now" smoke. Across surveys, respondents who gave a response other than "not at all" were considered current smokers (i.e., those who said they smoked "some days" or "every day").

Daily Cigarette Smoking. The 2015 HRBS, 2015 NSDUH, and 2015 BRFSS all contain items about daily cigarette use. Like current cigarette smoking, differences between the NSDUH and the BRSS required two versions of this outcome.

The first version of this outcome compares the 2015 HRBS and the 2015 NSDUH. The 2015 HRBS assessed cigarette/tobacco use by using items from the National Health Interview Survey (CDC, 2015b). Participants were first asked if they had ever smoked at least 100 cigarettes in their lifetime, and, if yes, how many cigarettes they had smoked in the past 30 days. If respondents indicated that they smoked at least one cigarette on each of the past 30 days, they were considered a daily smoker. Similarly, the NSDUH asked respondents if they had smoked any portion of a cigarette in the past 30 days. Daily smokers were thus defined as individuals who have smoked at least part of one cigarette in each of the past 30 days.

The second version of this outcome compares the 2015 HRBS and the 2015 BRFSS. Items on the 2015 BRFSS are similar, but do not include the question about how many cigarettes the respondent has smoked in the past 30 days. For both the HRBS and the BRFSS, all respondents who indicate smoking at least 100 cigarettes are asked if they "now" smoke. Across surveys, respondents who said they smoke "every day" were considered daily smokers.

Current Smokeless Tobacco Use. The 2015 HRBS, 2015 NSDUH, and 2015 BRFSS all contain items about current smokeless tobacco use. Respondents in the 2015 HRBS were

asked if they have ever used chewing tobacco or snuff, and if so, were asked if they did so in the past 30 days. Similarly, the 2015 NSDUH asked respondents to indicate if they had ever used smokeless tobacco, and if so, how long it had been since their last use (which allowed us to determine if they had used it in the past 30 days). The 2015 BRFSS asked respondents how often they currently used smokeless tobacco (every day, some days, not at all, other/refused). Across all surveys, if a respondent reported current use of smokeless tobacco (in the BRFSS) or in the past 30 days (in the HRBS and NSDUH), they were considered a current smokeless tobacco user.

Current E-Cigarette Use. The 2015 HRBS and the 2016 BRFSS both contain items about current e-cigarette use. Participants in the 2015 HRBS were asked if they ever used e-cigarettes and, if so, if they used them within the past 30 days. The 2016 BRFSS similarly asked about ever using e-cigarettes and, if respondents indicated that they had done so, they were asked to indicate how often they now used them (every day, some days, not at all, other/refused). If a participant reported use in past 30 days in the HRBS or any current use in the BRFSS, they were considered a current e-cigarette user.

Current Marijuana Use. The 2015 HRBS, the 2015 NSDUH, and the 2016 BRFSS contain items about current marijuana use. All three surveys asked respondents to indicate if they had used marijuana in the past 30 days. Note that the HRBS explicitly mentioned synthetic cannabis, which is not true of the NSDUH or BRFSS.

Matching Variables

The civilian surveys described above were designed to assess the relevant outcomes in a representative sample of the noninstitutional adult population of the United States. Because the characteristics of military service members differ dramatically from those of the broader U.S. population, it is difficult to interpret differences between the standard estimates from these surveys and the military. To improve the interpretability of comparisons between the military and civilian populations, we compared estimates from the HRBS (a weighted, representative sample of service members) to samples of civilians that have been reweighted to have the same demographic characteristics as the military population.

Specifically, the weights balanced each of the civilian samples to the military on the following characteristics:

- **Gender.** Male and female.
- **Age.** 18–25 years, 26–34 years, 35–49 years, 50–64 years, and 65+ years. These categories are used for the NSDUH analysis. Continuous age is used for the BRFSS and NHANES
- **Race/ethnicity.** Non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic Asian, other single race, and multiple races. These categories are used for the NSDUH and BRFSS. For the NHANES, we combined the other single race and multiple races categories.
- **Marital status.** Married, separated, divorced, widowed, and other marital status. This categorization is used for the BRFSS. The NHANES analysis uses the following categories: married; single, never married; cohabiting, never married; separated; divorced; and widowed. The NSDUH analysis uses a simple dichotomy of married versus not married.
- **Educational attainment.** Less than high school, high school diploma/GED, some college, and bachelor's degree or higher. These categories are used for the BRFSS and the

NSDUH. The NHANES analysis uses three categories: less than high school, high school diploma/GED, and more than high school.
- **Parental status.** The number of children under the age of 18 is used in the BRFSS analysis. A categorical variable is used in the NSDUH and NHANES analyses: no children over the age of 18 in the household, one child, two children, and three or more children.
- **Sexual orientation.** Heterosexual, gay/lesbian, and bisexual. Note that the BRFSS does not include this measure.
- **Occupation.** Civilians who were not employed and not attending school (e.g., those who were retired, disabled, etc.) were given a weight of zero for matching because no similar individuals exist in the military sample.

Analysis

Propensity weights were derived using the TWANG package in the R statistical programming language (Griffin et al., 2014). This package uses a regression model to produce inverse probability weights for each case in the civilian data. Specifically, it uses a nonlinear, iterative machine learning algorithm to predict sample membership (McCaffrey, Ridgeway, and Morral, 2004; Ridgeway, 2006), and selects as the final iteration the one that produces weights that achieve the best balance between the sample-weighted HRBS and the propensity-weighted civilian survey (BRFSS, NSDUH, or NHANES). The underlying model results in weights that balance the military and civilian samples on each of the variables listed above, as well as all two-way and three-way interactions among those variables. Separate weights were derived for each of the civilian surveys, and the balance achieved by those weights is shown in Tables A.7–A.10. In each case, the weighted civilian sample had characteristics that very closely matched the military population. For example, the prevalence of each demographic category was within 1 percentage point across the population-weighted HRBS and the propensity-weighted civilian surveys.

Table A.7
Balance Between the Health Related Behaviors Survey and the National Survey on Drug Use and Health

	HRBS Percentage	Matched NSDUH Percentage
Gender		
Male	84.4	83.8
Female	15.6	16.2
Age		
18–25	33.5	32.7
26–34	37.1	37.7
35–49	27.3	27.6
50–64	2.0	2.0
65+	0.1	0.1
Race/Ethnicity		
Hispanic	16.5	16.5
Non-Hispanic white	57.9	56.2
Non-Hispanic black	11.3	10.9
Non-Hispanic Asian	5.0	5.7
Other single race	3.9	5.5
Multiple races	5.2	5.3
Sexual Orientation		
Heterosexual	78.3	81.1
Gay/lesbian	2.2	2.4
Bisexual	2.6	2.4
Marital Status		
Not married	42.7	42.1
Married	57.3	57.9
Education Level		
12th grade or less, no diploma	0.2	0.2
High school diploma/GED	20.2	21.1
Some college	34.7	34.3
Associate's degree	13.8	14.0
Bachelor's degree or higher	31.0	30.4
Number of Children in the Household		
None	59.4	58.9
One	16.0	17.1
Two	15.8	15.0
Three or more	8.6	8.9

NOTE: All numbers represent the percentage of each sample in each category, except for continuous variables where means are provided.

Table A.8
Balance Between the Health Related Behaviors Survey and 2015 Behavioral Risk Factor Surveillance System

	HRBS Percentage	Matched 2015 BRFSS Percentage
Gender		
Male	84.4	84.6
Female	15.6	15.4
Age		
Mean years	30.5	30.5
Race/Ethnicity		
Hispanic	16.5	16.1
Non-Hispanic white	57.9	58.2
Non-Hispanic black	11.3	11.4
Non-Hispanic Asian	5.0	5.1
Other single race	3.9	3.8
Multiple races	5.2	5.3
Marital Status		
Married	57.3	57.6
Separated	1.9	1.9
Divorced	5.4	5.4
Widowed	0.2	0.1
Other	35.1	34.9
Education Level		
12th grade or less, no diploma	0.2	0.3
High school diploma/GED	20.2	20.3
Some college	48.5	48.2
Bachelor's degree or higher	31.0	31.3
Number of Children in the Household		
Mean number of children	1.0	1.0

NOTE: All numbers represent the percentage of each sample in each category, except for continuous variables where means are provided.

Table A.9
Balance Between the Health Related Behaviors Survey and 2016 Behavioral Risk Factor Surveillance System

	HRBS Percentage	Matched BRFSS 2015 Percentage
Gender		
Male	84.4	84.5
Female	15.6	15.5
Age		
Mean years	30.5	30.5
Race/Ethnicity		
Hispanic	16.5	16.2
Non-Hispanic white	57.9	57.9
Non-Hispanic black	11.3	11.3
Non-Hispanic Asian	5.0	5.0
Other single race	3.9	3.8
Multiple races	5.2	5.6
Marital Status		
Married	57.3	57.4
Separated	1.9	1.9
Divorced	5.4	5.5
Widowed	0.2	0.2
Other	35.1	35.0
Education Level		
12th grade or less, no diploma	0.2	0.3
High school diploma/GED	20.2	20.1
Some college	48.5	48.6
Bachelor's degree or higher	31.0	31.0
Number of Children in the Household		
Mean number of children	0.8	0.8

NOTE: All numbers represent the percentage of each sample in each category, except for continuous variables where means are provided.

Table A.10
Balance Between the Health Related Behaviors Survey and the National Health and Nutrition Examination Survey

	HRBS Percentage	Matched NHANES Percentage
Gender		
Male	84.4	84.7
Female	15.6	15.3
Age		
Mean years	30.5	30.9
Race/Ethnicity		
Hispanic	16.5	14.3
Non-Hispanic white	57.9	56.5
Non-Hispanic black	11.3	12.5
Non-Hispanic Asian	5.0	6.2
Other/multiple races	9.1	10.5
Sexual Orientation		
Heterosexual	78.3	81.6
Gay/lesbian	2.2	1.9
Bisexual	2.6	1.9
Marital Status		
Married	57.3	58.5
Single, never married	32.1	30.6
Cohabitating, not married	3.0	3.3
Separated	1.9	1.2
Divorced	5.4	6.2
Widowed	0.2	0.1
Education Level		
12th or less, no diploma	0.2	0.2
High school diploma/GED	20.2	17.2
More than high school	79.6	82.6
Number of Children in the Household		
None	59.4	59.2
One	16.0	16.9
Two	15.8	15.6
Three or more	8.6	8.4

NOTE: All numbers represent the percentage of each sample in each category, except for continuous variables where means are provided.

APPENDIX B

Mental Health Care Service Utilization Among Minority Active Duty Service Members

This appendix presents results from an additional analysis that examined patterns of mental health care service utilization by minority status.[1] The goal of this analysis was to assess patterns of mental health service utilization by racial/ethnic, gender, and sexual orientation among active duty U.S military personnel and to determine whether individual characteristics and military-specific risk factors and stressors alter the association between minority status and service utilization.

Racial/Ethnic, Gender, and Sexual Orientation Differences in Mental Health Care Service Utilization in Civilian Populations

Racial/ethnic minority groups in the civilian population generally report lower use of mental health care services in comparison with non-Hispanic whites, and this has been found using data from the National Comorbidity Survey (Alegría et al., 2002), the NSDUH (Sheehan, Walsh, and Liu, 2018), the National Epidemiologic Survey on Alcohol and Related Conditions (Hatzenbuehler et al., 2008), and electronic health records (Hahm et al., 2015).

The evidence for gender differences in mental health care utilization is mixed, though it generally finds that women are more likely to use care than men. Data from the Epidemiologic Catchment Area Survey yielded no differences in mental health care utilization by gender; however, women were more likely to seek help from a general medical doctor about a mental health–related problem (Leaf and Bruce, 1987). In contrast, other studies have found that women use more mental health services than men (Kessler, Brown, and Broman, 1981; Ojeda and McGuire, 2006; Rhodes et al., 2002).

Two recent studies using nationally representative samples found that sexual orientation minority individuals are more likely to receive mental health services than their heterosexual counterparts. Data from the 2013–2014 National Health Interview Survey indicated that LGB individuals were more likely to use mental health services (i.e., visiting a mental health provider in the past 12 months) than their heterosexual counterparts after controlling for demographic variables—that is, age, race/ethnicity, nativity, relationship status, education, family income, and geographic region (Cochran, Björkenstam, and Mays, 2017). Similar results were found using the 2013 to 2015 National Health Interview Survey (Platt and Scheitle, 2018).

[1] We thank Jasmine Davis for her assistance with this appendix.

Racial/Ethnic, Gender, and Sexual Orientation Differences in Mental Health Care Service Utilization in Military Populations

Similar to racial/ethnic differences in the civilian populations, racial/ethnic minority service members are also less likely to receive mental health services. Using the 2008 HRBS of active duty service members, McKibben and colleagues (2013) found that racial/ethnic minority soldiers were less likely to receive the highest level of mental health care (defined as use of both a mental health professional and prescribed medication) in comparison with non-Hispanic whites. Other research using data from the Army Study to Assess Risk and Resilience in Service Members found that non-Hispanic black service members with a current internalizing disorder (e.g., generalized anxiety disorder, MDD, or PTSD) were less likely to be in mental health treatment than their non-Hispanic white counterparts (Colpe et al., 2015).

Evidence for gender differences in mental health care utilization in service members is equivocal. Using data from the 2008 HRBS, McKibben and colleagues (2013) did not find any gender differences in the use of the highest level of mental health care (defined as use of a mental health professional or prescribed medication) among soldiers. However, female soldiers reported a higher likelihood of receiving *any* mental health services than male soldiers. In a sample of Army combat medics deployed to Operation Iraqi Freedom/Operation Enduring Freedom, female and male Army combat medics reported similar utilization rates of mental health professionals (Elnitsky et al., 2013). However, male Army combat medics were less likely to seek mental health care from a general medical doctor compared with female Army combat medics. Extant research suggests that gender differences in mental health care utilization may depend on the type of care, or provider, in question.

To the authors' knowledge, there are no published studies investigating whether sexual minorities in the military experience mental health care disparities. As discussed earlier, sexual minority civilians are more likely to use mental health services than their heterosexual counterparts (Cochran, Björkenstam, and Mays, 2017; Platt and Scheitle, 2018). However, the experience may be different for sexual minority (LGB) service members because they may encounter barriers to accessing care within the military health care system. Although the Don't Ask, Don't Tell policy has been repealed, sexual minority service members continue to be reluctant to discuss their sexual orientation within the context of their mental health care (Johnson et al., 2015; Rerucha et al., 2018).

Explanations for Minority Group Differences in Mental Health Care Utilization

Research investigating mechanisms that may explain racial/ethnic, gender, and sexual orientation differences in mental health care utilization has identified three categories of mechanisms: individual, sociocultural, and institutional. The majority of this research has utilized civilian data, and very little empirical research exists to explain differences found among service members.

Individual explanations include lack of financial resources, limited health literacy, and lack of knowledge about service options and availabilities. Lack of or inadequate health insurance and cost concerns have been cited as barriers to receiving mental health services in racial/ethnic minority civilians (Alegría et al., 2006; Kouyoumdjian, Zamboanga, and Hansen, 2003;

McGuire and Miranda, 2008; Vega and Lopez, 2001), LGB civilians (Romanelli and Hudson, 2017), female civilians (Sherbourne, Dwight-Johnson, and Klap, 2001), and female veterans (Runnals et al., 2014). Ojeda and McGuire (2006) found that non-Hispanic black, Hispanic, and Asian civilians reported experiencing financial barriers (e.g., losing pay from work) more frequently than non-Hispanic white civilians. Similarly, qualitative research has found that lack of time and lack of transportation limit the use of mental health care for non-Hispanic black, Hispanic, and LGB civilians (Hines-Martin et al., 2003; Kouyoumdjian, Zamboanga, and Hansen, 2003; Romanelli and Hudson, 2017; Vega and Lopez, 2001). Furthermore, some racial/ethnic minority and sexual minority civilians have limited awareness of mental health treatment and resources (Hines-Martin et al., 2003; Romanelli and Hudson, 2017).

A number of sociocultural mechanisms have been identified to explain group differences in mental health care utilization. Stigma attached to mental illness and seeking mental health services is perhaps one of the most robust explanations; it has been found to limit or delay mental health care in non-Hispanic black civilians (Briggs et al., 2011), Asian civilians (Leong and Lau, 2001), Hispanic civilians (Kouyoumdjian, Zamboanga, and Hansen, 2003), LGB civilians (Romanelli and Hudson, 2017), and female civilians (Sherbourne, Dwight-Johnson, and Klap, 2001). In addition, research on racial/ethnic minority disparities in mental health care utilization has found that racial/ethnic minority individuals are hesitant to seek help from mental health professionals because it is considered shameful to discuss problems outside the family (Briggs et al., 2011; Kim-Goh, Choi, and Yoon, 2015; Leong and Lau, 2001). As such, seeking help from family is an alternative for many non-Hispanic black, Hispanic, and Asian civilians (Briggs et al., 2011; Kouyoumdjian, Zamboanga, and Hansen, 2003; Leong and Lau, 2001; Vega and Lopez, 2001). In non-Hispanic black and Hispanic communities, religious leaders also serve as an alternative to mental health professionals because religious institutions have historically provided a variety of resources in these communities and religious leaders are trusted by community members (Briggs et al., 2011; Farris, 2007; Kouyoumdjian, Zamboanga, and Hansen, 2003). Finally, limited English proficiency is a barrier to mental health care for Hispanic and Asian civilians whose native language is not English (Kim-Goh, Choi, and Yoon, 2015; Kouyoumdjian, Zamboanga, and Hansen, 2003; Leong and Lau, 2001; Vega and Lopez, 2001).

The last category of explanatory variables includes institutional mechanisms. These mechanisms are structural ones such as perceived discrimination, lack of access to high-quality care, and lack of culturally appropriate care. Perceived discrimination has been found to explain the lower rate of mental health care utilization in racial/ethnic minority civilians. In a study that included a representative sample from Hennepin County, Minnesota, experience with perceived discrimination outside the health care system was associated with greater likelihood of underutilization of mental health care in U.S.-born non-Hispanic black, Southeast Asian, and American Indian civilians after controlling for demographic variables, socioeconomic variables, and health conditions (Burgess et al., 2008). Underutilization was measured by asking respondents whether they had delayed receiving the mental health care they thought they needed in the past 12 months. Because of experiencing perceived discrimination within and outside the health care system, non-Hispanic black individuals develop mistrust toward mental health providers and the health care system in general (Briggs et al., 2011; Whaley, 2001). A meta-analysis found that lack of trust in institutions was negatively associated with positive attitudes and behaviors related to counseling and therapy in non-Hispanic black civilians (Whaley, 2001). A recent systematic review on sexual orientation–related disparities in mental

health care utilization has also identified perceived provider's discrimination and mistreatment by health care providers as important barriers to using mental health care among LGB civilians (Stotzer, Silverschanz, and Wilson, 2013). LGB service members are also reluctant to discuss their sexual orientation in mental health care contexts (Johnson et al., 2015; Rerucha et al., 2018).

In addition to experiencing discrimination, racial/ethnic and sexual minority civilians disproportionately reside in low-income and low-resource areas in which access to high-quality mental health care is limited (McGuire and Miranda, 2008; Stotzer, Silverschanz, and Wilson, 2013). Furthermore, lack of culturally appropriate care creates another barrier to mental health care utilization. Lack of cultural competence in mental health professionals has been cited as a barrier for non-Hispanic black civilians (Snowden, 2001), Hispanic civilians (Vega and Lopez, 2001), Asian civilians (Leong and Lau, 2001), LGB civilians (Romanelli and Hudson, 2017; Stotzer, Silverschanz, and Wilson, 2013), and female veterans (Oishi et al., 2011; Owens, Herrera, and Whitesell, 2009).

Methodology

Data come from the 2015 HRBS (Meadows et al., 2018). The analysis sample was restricted based on four need-based criteria: (1) perceived need of mental health care in the past 12 months, either self-perceived or otherwise perceived (i.e., reporting that someone else suggested that you receive treatment for a mental health issue); (2) self-reported symptomology in the past 12 months that met criteria for probable generalized anxiety disorder, MDD, or PTSD; (3) receipt of care from a general doctor or mental health care specialist in the past 12 months; or (4) use of psychotropic medication in the past 12 months. Based on these restrictions, the sample size was 5,283.

Approach

This analysis uses the same approach as outlined in Chapter Three and Appendix A. A series of nested, weighted logistic regressions allowed us to examine whether differences in minority-majority use of various types of health care providers (defined below) could be explained by several sociodemographic and military characteristics. We begin by describing the association between minority status—race/ethnicity, gender, and sexual orientation—and the outcome in question in a bivariate model, with no covariates (Model 1: Bivariate). Starting with Minority Membership (Model 2), we sequentially introduced the explanatory factors into a logistic regression model in the following order:

- **Model 2: Minority Membership.** Unlike Model 1, this model includes indicators for all the minority memberships, including race/ethnicity, gender, and sexual orientation, at the same time.
- **Model 3: Individual Characteristics.** In addition to the covariates in Model 2, Model 3 also includes indicators for age, education, marital status, parental status, and service branch.
- **Model 4: Military Experiences.** In addition to the covariates in Model 3, Model 4 includes indicators for pay grade and the time service members spent in deployment over the 12 months prior to the survey.

- **Model 5: Stressors/Risk Factors.** In addition to the covariates in Model 4, Model 5 includes indicators for the lifetime number of combat trauma events experienced by the service member, perceived emotional social support, lifetime experience with physical abuse, lifetime unwanted sexual contact, and financial stress. Unlike the models in Chapter Three, in this supplemental analysis of mental health care utilization we also include controls for type of need (based on self-perception and other perception), probable generalized anxiety disorder (Löwe et al., 2008; Spitzer et al., 2006), probable MDD (Kroenke, Spitzer, and Williams, 2001), and probable PTSD (Weathers et al., 1993).

All analyses use the original weights produced for the 2015 HRBS. Results presented in the tables in this appendix are presented as unadjusted or adjusted ORs and 95 percent CIs for each of the racial/ethnic, gender, and sexual orientation categories.

Dependent Variables

Type of Health Care Provider. The 2015 HRBS asked respondents to indicate whether they had used any care from various provider types in the past year. We examine whether service members received care from a general medical doctor and/or a mental health specialist (e.g., psychologist, psychiatrist), a civilian care provider, and a community-centered care provider (e.g., military chaplain, civilian clergy, or self-help group).

Perceived Stigma. The 2015 HRBS include one item on career-related stigma associated with service use: "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?" Service members responded with a "yes" or a "no."

Results

Mental Health Care Service Use from General Medical Doctors and Mental Health Specialists

Results for use of care from a general medical doctor or mental health specialist are shown in Table B.1.

Race/Ethnicity. Bivariate analyses (Model 1) found that, in comparison with non-Hispanic white service members, service members who identified with multiple race groups reported significantly lower likelihood of mental health care service use from both general doctors or mental health care specialists (OR = 0.64; 95 percent CI [0.42, 0.97]). The difference remained significant in models that controlled for demographic and explanatory variables. In Minority Membership (Model 2), when controlling for gender and sexual minority status, service members who identified with multiple race groups were significantly less likely than their white counterparts to utilize mental health care services from both general and specialty mental health care providers (OR = 0.62; 95 percent CI [0.41, 0.95]). The addition of military experiences and stressors and risk factors did not change this pattern. In the final model (Stressors/Risk Factors, Model 5), multiple-race service members remained significantly less likely to report utilizing mental health care services than their white peers (OR = 0.63; 95 percent CI [0.40, 0.98]).

Table B.1
Regression Models for Mental Health Care Service Use from General Medical Doctors and/or Mental Health Specialists, by Minority Group Status

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race/Ethnicity					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	1.35 (0.94–1.94)	1.31 (0.91–1.90)	1.09 (0.75–1.60)	1.07 (0.73–1.56)	1.01 (0.66–1.53)
Non-Hispanic Asian	1.36 (0.69–2.68)	1.37 (0.69–2.72)	1.28 (0.67–2.44)	1.23 (0.64–2.37)	1.11 (0.57–2.16)
Hispanic	0.74 (0.53–1.03)	0.74 (0.53–1.03)	0.78 (0.55–1.09)	0.77 (0.54–1.08)	0.82 (0.57–1.16)
Other single race category	0.88 (0.51–1.53)	0.89 (0.51–1.55)	0.74 (0.42–1.29)	0.73 (0.41–1.29)	0.77 (0.42–1.40)
Multiple races	0.64* (0.42–0.97)	0.62* (0.41–0.95)	0.65* (0.43–0.99)	0.64* (0.42–0.98)	0.63* (0.40–0.98)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.07 (0.61–1.88)	1.00 (0.57–1.75)	1.25 (0.69–2.28)	1.26 (0.69–2.29)	1.05 (0.61–1.81)
Bisexual	1.19 (0.73–1.93)	1.17 (0.73–1.89)	1.49 (0.89–2.49)	1.49 (0.89–2.49)	1.52 (0.90–2.57)
Female	1.24* (1.03–1.49)	1.21* (1.00–1.47)	1.18 (0.96–1.45)	1.17 (0.95–1.44)	1.09 (0.86–1.39)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Gender. In bivariate analyses (Model 1), women reported significantly higher likelihood of mental health service use compared with men (OR = 1.24; 95 percent CI [1.03–1.49]). The difference remained significant in models that controlled for demographic variables. In Minority Membership (Model 2), when controlling for race/ethnicity and sexual minority status, women were still more likely to use care from both general doctors and mental health care specialists (OR = 1.21; 95 percent CI [1.00, 1.47]). However, once controls for individual characteristics, military experiences, and stressors and risk factors are included, the significant gender difference in rate of mental health service utilization disappeared. Note that though

the significance level dropped below 0.05 in Model 2, the magnitude of the OR was only slightly changed. After including the full set of explanatory factors, the OR had been reduced by roughly 10 percent, from 1.21 in Model 2 to 1.09 in Model 5.

Sexual Orientation. There were no statistically significant observed differences across sexual orientation groups in terms of their use of general medical doctors and/or mental health specialists.

Mental Health Care Service Use from a Civilian Care Provider

Results for use of care from a civilian provider are shown in Table B.2.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic Asian service members were significantly less likely to utilize civilian mental health care service than non-Hispanic white service members (OR = 0.44; 95 percent CI [0.22–0.90]). Non-Hispanic black service members (OR = 1.62; 95 percent CI [1.06–2.47]), as well as service members who identified with a single other race group (OR = 2.22; 95 percent CI [1.14–4.32]), were significantly more likely to utilize a civilian mental health care service provider than their non-Hispanic white peers. In Minority Membership (Model 2), when controlling for gender and sexual minority status, non-Hispanic Asian service members remained significantly less likely than their white counterparts to utilize mental health care services from civilian providers (OR = 0.44; 95 percent CI [0.21, 0.89]), while non-Hispanic blacks (OR = 1.58; 95 percent CI [1.03, 2.44]) and other single-race service members (OR = 2.22; 95 percent CI [1.13, 4.37]) remained significantly more likely to utilize civilian providers. Adding controls for Individual Characteristics (Model 3), Military Experiences (Model 4), and Stressors/Risk Factors (Model 5) did not account for significant differences between non-Hispanic Asian service members and those who identified as another single race and their non-Hispanic white peers. However, the adjusted OR for non-Hispanic blacks was no longer significant after controlling for sociodemographic characteristics in Minority Membership (Model 2); the overall reduction in the OR was roughly 5 percent by the final model (Stressors/Risk Factors, Model 5). In the final model, non-Hispanic Asians were significantly less likely (OR = 0.35; 95 percent CI [0.15, 0.84]) and other single-race service members were significantly more likely (OR = 2.07; 95 percent CI [1.03, 4.13]) to report utilizing a civilian provider than non-Hispanic white service members.

Gender. There were no statistically significant observed differences by gender in terms of the use of civilian providers.

Sexual Orientation. There were no statistically significant observed differences across sexual orientation groups in terms of the use of civilian providers.

Mental Health Service Use from Community Care

Results for use of care from the community are shown in Table B.3.

Race/Ethnicity. Bivariate analyses (Model 1) showed that, compared with non-Hispanic white service members, non-Hispanic blacks were significantly more likely to report utilizing community or community care (ORs = 1.49; 95 percent CI [1.02–2.18]). This difference was not statistically significant in Individual Characteristics (Model 3) but reemerged when Military Experiences (Model 4) and Stressors/Risk Factors (Model 5) were added. In Military Experiences (Model 4), non-Hispanic black service members were once again more likely to utilize community health care than their non-Hispanic white peers (OR = 1.51; 95 percent CI [1.01, 2.27]). Finally, in Stressors/Risk Factors (Model 5), non-Hispanic black service members

Table B.2
Regression Models for Mental Health Care Service Use from Civilian Care Providers, by Minority Group Status

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race/Ethnicity					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	1.62* (1.06–2.47)	1.58* (1.03–2.44)	1.49 (0.98–2.28)	1.49 (0.98–2.29)	1.50 (0.98–2.29)
Non-Hispanic Asian	0.44* (0.22–0.90)	0.44* (0.21–0.89)	0.41* (0.19–0.88)	0.41* (0.19–0.91)	0.35* (0.15–0.84)
Hispanic	0.73 (0.50–1.07)	0.73 (0.50–1.07)	0.80 (0.54–1.18)	0.80 (0.54–1.18)	0.85 (0.58–1.25)
Other single race	2.22* (1.14–4.32)	2.22* (1.13–4.37)	2.11* (1.02–4.38)	2.11* (1.02–4.40)	2.07* (1.03–4.13)
Multiple races	0.92 (0.56–1.54)	0.92 (0.55–1.53)	0.94 (0.56–1.57)	0.94 (0.56–1.57)	0.90 (0.53–1.53)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	1.20 (0.60–2.39)	1.26 (0.63–2.53)	1.79 (0.84–3.82)	1.79 (0.84–3.82)	1.62 (0.79–3.33)
Bisexual	0.92 (0.54–1.56)	0.92 (0.54–1.56)	1.22 (0.72–2.07)	1.21 (0.71–2.06)	1.04 (0.55–1.94)
Female	1.20 (0.96–1.50)	1.14 (0.90–1.43)	1.16 (0.90–1.49)	1.15 (0.89–1.49)	0.91 (0.66–1.25)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

remained significantly more likely to engage in community health care compared with their non-Hispanic white peers (OR = 1.58; 95 percent CI [1.02, 2.44]).

Gender. In bivariate analyses (Model 1), female service members showed significantly higher likelihood of utilizing care from community providers compared with men (OR = 1.26; 95 percent CI [1.03–1.55]), and this elevated service utilization was also evident in Individual Characteristics (Model 2; OR = 1.24; 95 percent CI [1.00, 1.54]). In all subsequent models, the gender difference was no longer statistically significant. Across all models, the OR was reduced by roughly 25 percent, from 1.24 in Model 2 to 0.91 in Model 5.

Table B.3
Regression Models for Mental Health Service Use from Community Care, by Minority Group Status

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race/Ethnicity					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	1.49* (1.02–2.18)	1.46 (1.00–2.15)	1.48 (0.99–2.22)	1.51* (1.01–2.27)	1.58* (1.02–2.44)
Non-Hispanic Asian	1.82 (0.90–3.66)	1.91 (0.94–3.90)	1.86 (0.93–3.72)	1.89 (0.93–3.81)	1.69 (0.83–3.46)
Hispanic	1.02 (0.72–1.45)	1.02 (0.72–1.46)	0.98 (0.68–1.42)	1.00 (0.69–1.43)	1.12 (0.77–1.64)
Other single race	1.74 (0.95–3.19)	1.79 (0.97–3.29)	1.65 (0.88–3.08)	1.61 (0.85–3.03)	1.65 (0.82–3.35)
Multiple races	1.04 (0.65–1.66)	1.00* (0.63–1.59)	0.99 (0.62–1.57)	0.98 (0.62–1.57)	0.95 (0.58–1.55)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	0.52 (0.24–1.12)	0.48 (0.23–1.03)	0.50 (0.23–1.09)	0.50 (0.23–1.11)	0.40* (0.19–0.84)
Bisexual	1.49 (0.94–2.36)	1.42 (0.90–2.25)	1.39 (0.85–2.26)	1.38 (0.85–2.25)	1.24 (0.78–1.98)
Female	1.26* (1.03–1.55)	1.24* (1.00–1.53)	1.17 (0.93–1.46)	1.17 (0.93–1.47)	0.91 (0.68–1.23)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

Sexual Orientation. The bivariate model (Model 1), as well as models that controlled for Minority Membership (Model 2), Individual Characteristics (Model 3), and Military Experiences (Model 4), did not reveal a statistically significant difference between heterosexual service members and their sexual minority peers in use of community providers. However, in models that controlled for the full set of covariates—for example, Stressors/Risk Factors (Model 5—gay/lesbian service members had a statistically significant lower likelihood of utilizing community mental health care compared with their heterosexual peers (OR = 0.40; 95 percent CI [0.19, 0.84]).

Perceived Career-Related Stigma Based on Mental Health Care Service Use

Results for perceived career-related stigma are shown in Table B.4.

Race/Ethnicity. In bivariate analyses (Model 1), non-Hispanic black service members were significantly less likely to perceive career-related stigma based on seeking care for mental health issues compared than their non-Hispanic white peers (OR = 0.52; 95 percent CI [0.37, 0.73]). In Minority Membership (Model 2), controlling for gender and sexual minority status, non-Hispanic black service members remained significantly less likely than their white counterparts to perceive stigma due to seeking mental health care services (OR = 0.53; 95 percent

Table B.4
Regression Models for Perceived Career-Related Stigma Based on Use of Mental Health Services, by Minority Group Status

	Bivariate (Model 1)	Minority Membership (Model 2)	Individual Characteristics (Model 3)	Military Experiences (Model 4)	Stressors/ Risk Factors (Model 5)
Minority Group	**Unadjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**	**Adjusted OR (CI)**
Race/Ethnicity					
Non-Hispanic white	REF	REF	REF	REF	REF
Non-Hispanic black	0.52* (0.37–0.73)	0.53* (0.37–0.76)	0.51* (0.35–0.73)	0.50* (0.34–0.73)	0.53* (0.36–0.78)
Non-Hispanic Asian	1.00 (0.51–1.97)	0.99 (0.50–1.95)	0.96 (0.49–1.89)	0.86 (0.45–1.68)	0.85 (0.39–1.84)
Hispanic	1.08 (0.77–1.50)	1.07 (0.77–1.50)	1.07 (0.77–1.51)	1.08 (0.77–1.52)	1.14 (0.79–1.65)
Other single race	1.11 (0.63–1.94)	1.09 (0.62–1.91)	1.11 (0.64–1.93)	1.09 (0.62–1.90)	0.97 (0.54–1.75)
Multiple races	0.95 (0.62–1.45)	0.99 (0.64–1.51)	0.96 (0.63–1.46)	0.94 (0.61–1.44)	0.84 (0.54–1.30)
Sexual Orientation					
Heterosexual	REF	REF	REF	REF	REF
Gay/lesbian	0.96 (0.56–1.66)	1.01 (0.58–1.78)	0.95 (0.53–1.69)	0.96 (0.53–1.72)	1.05 (0.57–1.95)
Bisexual	0.74 (0.46–1.19)	0.81 (0.50–1.30)	0.82 (0.50–1.32)	0.85 (0.52–1.38)	0.70 (0.43–1.13)
Female	0.70* (0.58–0.84)	0.75* (0.62–0.90)	0.75* (0.61–0.92)	0.75* (0.61–0.92)	0.77* (0.59–0.99)

NOTES: Bivariate (Model 1) is a set of three models that examines the association between a single minority membership group and the outcome.

Minority Membership (Model 2) includes race, sexual orientation, and gender.

Individual Characteristics (Model 3) adds age, education, marital status, children, and service branch.

Military Experiences (Model 4) adds pay grade and length of deployment.

Stressors/Risk Factors (Model 5) adds number of combat exposures, social support, physical abuse, unwanted sexual abuse, and financial stress.

CI = 95% confidence interval; OR = odds ratio; REF = reference category.

* Denotes statistical significance ($p < 0.05$).

CI [0.37, 0.76]). This trend persisted in all subsequent models. In the final model, Stressors/Risk Factors (Model 5), non-Hispanic blacks remained significantly less likely to report perceived career-related stigma based on mental health care service use (OR = 0.53; 95 percent CI [0.36, 0.78]).

Gender. In bivariate analyses (Model 1), women showed significantly lower likelihood of perceiving career-related stigma associated with use of care (OR = 0.70; 95 percent CI [0.58, 0.84]). This trend persisted in all subsequent models. In the final model, Stressors/Risk Factors (Model 5), women had a significantly lower likelihood or perceived career-related stigma based on service use (OR = 0.77; 95 percent CI [0.59, 0.99]).

Sexual Orientation. There were no statistically significant observed differences across sexual orientation groups in terms perceived career-related stigma.

Conclusion

We found no evidence of systematic minority-majority group differences in mental health service use from general medical doctors, mental health specialists, or civilian providers. However, the results suggest that particular minority groups are concurrently utilizing services from multiple provider types. Additional research should explore why certain groups seek care from multiple providers and whether these networks of care are actually effective. Future studies could also examine which factors influence network of care selection, and whether coordination between providers and sectors of care can improve mental health outcomes.

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Behavioral health disparities, in which socially disadvantaged groups—such as racial/ethnic minorities, women, and sexual-orientation minorities—experience greater risk for certain mental health and substance use problems, are well documented in the general population. Less is known about whether similar behavioral health disparities exist among military service members. The U.S. Department of Defense (DoD) desires to understand whether the behavioral health disparities seen in the civilian population also exist in the military, as this knowledge is important to helping DoD target its efforts to address the needs of service members and improve force readiness.

To investigate this issue, the authors examined (1) whether minority-group service members are more likely to experience mental health and substance use problems relative to their majority counterparts in the military and (2) whether minority–majority group differences in behavioral health in the military are similar to or different from those in the civilian population.

The authors used data from the 2015 Health Related Behaviors Survey, the 2015 National Survey on Drug Use and Health, the 2015 and 2016 Behavioral Risk Factor Surveillance System, and the 2015 National Health and Nutrition Examination Survey. Behavioral health outcomes include mental health (e.g., depression, suicide behaviors, posttraumatic stress disorder) and substance use (e.g., problematic alcohol use, tobacco use) conditions.

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