## Introduction

Military service has long been associated with honor and sacrifice. The same is true for our troops who have served and who continue to serve our country in Iraq and Afghanistan. For many of these men and women, a safe return home does not bring an end to the challenges of the armed conflicts. Instead, they may confront pervasive mental health issues, such as depression and posttraumatic stress disorder and the aftermath of traumatic brain injury. These conditions can go undetected and untreated and have been described as "invisible wounds."[1] In addition, many of our service members struggle with the misuse of substances such as tobacco, alcohol, and other drugs. Difficulties when service members return to daily life within their family and community environments are commonly encountered.[1,2]

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All of these issues can profoundly affect the quality of life for military personnel and their families, who share in the sacrifice of military service. In order to ensure that our military and their families receive proper care and are supported in their readjustment to life after deployment, it is helpful to learn more about the challenges they may face. This chapter will define these conditions and explore their scope and potential impact.

## Traumatic Brain Injury

According to the Centers for Disease Control and Prevention (CDC) and the Defense and Veterans Brain Injury Center (DVBIC), traumatic brain injury (TBI) is an injury that "is caused by a bump, blow, or jolt to the head or a penetrating head injury that disrupts the normal function of the brain."[3,4] *Penetrating head injuries* are those in which an object breaks through the skull and into underlying brain tissues. Gunshot wounds are an example of this type of injury. In contrast, *closed head injuries* leave the skull intact.[5] Similar to civilians, military personnel can sustain TBI from falls, assaults, and motor vehicle crashes. In combat settings, these injuries may also be caused by firearms and, in the current conflicts, even more commonly by blasts.[4]

Blasts are a regular occurrence in the combat zones of Afghanistan and Iraq and are caused by several types of weapons, such as improvised explosive devices (IEDs), grenades, and land mines.[6] According to the latest summary of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) casualties, blasts account for nearly three-quarters (73%) of overall injuries and fatalities.[7] In addition to causing a broad spectrum of injuries, blasts cause TBI by means of several mechanisms. Pressure waves created by the blast may directly injure the brain without visible evidence of head trauma.[8] Blasts also generate wind that may thrust the victim, explosive fragments, and debris into the air. Brain injury may result if the victim's head strikes an object or is struck by airborne material during the explosion.[6,8] These mechanisms may occur in combination, adding to the complexity of TBI.[6,9]

The manifestations and consequences of traumatic brain injury vary widely, with injury severity and location being important factors. There are three categories of TBI—mild, moderate, and severe, based on acute injury characteristics. This categorical classification system is based on clinical presentation immediately following the injury. It does not change over time as a person's condition changes.[1] Injuries are categorized on the basis of the degree of resulting impairment in consciousness, memory, and cognitive function, and on the presence of neurological symptoms or deficits.[10,11] According to the Defense and Veterans Brain Injury Center (DVBIC), more than 178,000 service members have been diagnosed with TBI during the past 10 years. Of these injuries, approximately 77% have been classified as mild, 17% as moderate, and only 1% as severe. Fewer than 2% of TBIs have resulted from penetrating trauma. Therefore, the majority of TBI cases diagnosed among service members have been mild TBI, presumably due to blunt head trauma or blast.[11]

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Mild TBI or *concussion* is a closed head injury that may occur when the head is impacted by or impacts an object. It can also be caused by blast exposure with or without direct head trauma.[8,10] Research indicates that blast may be the more common cause of mild TBI in OEF/OIF.[12,a] According to established clinical guidelines, mild TBI is an initial injury that is followed by a brief period of unconsciousness or decreased consciousness, transient periods of posttraumatic confusion, or amnesia. For TBI to be considered mild, clinical imaging studies must also be normal.[10] Although considered the least severe form of TBI, concussion can produce a wide variety of symptoms. Headache is the most frequent symptom, but other problems include fatigue, vision changes, dizziness, and balance difficulties.[4,10] Those with concussion may also experience problems with sleep, memory, and/or concentration. They may also find themselves feeling irritable, anxious, or depressed. Although symptoms may be unpleasant and distressing for some, the majority of cases resolve in time without lasting effects.[4,10] Recovery for service members who incur a combat-related concussion may be more difficult than for civilians who incur a TBI, because of the traumatic circumstances in which the initial combat-related concussion occurred.[13]

In addition, service members may incur multiple concussions during their tour (or multiple tours) of combat duty. It is possible that multiple concussions may have a cumulative effect that impairs long-term recovery and prognosis. Studies in athletes call this "second injury syndrome." Many service members with TBI may also have co-occurring mental health problems, such as posttraumatic stress disorder (PTSD), depression, anxiety, mood disorders, addiction disorders, and/or suicide ideation.[1] Individuals with co-occurring disorders have more severe symptoms, and the recovery process may be more complicated. Many service members with mild TBI report that symptoms persist and that their mild TBI

a In a survey of more than 2,500 Army soldiers returning from deployment to Iraq, approximately three-quarters (73%-79%) of those with a self-reported history of mild TBI identified blast as the injury mechanism.[12]

has also contributed to problems with employment, school, family relations, and social interaction.[14] Individuals who have symptoms that do not respond to initial treatment should receive further evaluation and referrals to specialists.[10]

Researchers have begun to evaluate the prevalence of mild TBI among military personnel serving in Iraq and Afghanistan. In surveys of returning service members, approximately 15% to 19% reported screening criteria consistent with having sustained a mild TBI during deployment.[1,12] On the basis of screening surveys, it has been suggested that as many as 320,000 service members may have sustained a mild TBI during these conflicts.[1] The number of clinically confirmed cases within the military healthcare system is much lower, with approximately 137,000 mild TBIs recorded since 2000.[11]

According to the DVBIC, various factors make the identification of TBI a potentially challenging process, particularly when injuries are the result of blast exposure. For example, mild TBI may be the sole injury sustained in a blast. Those who are injured in this manner may lack visible evidence of physical trauma. In these instances, the service member may be unaware of the injury. In the absence of very obvious impairment, the mild TBI may not be detected by others. In other circumstances, TBI may be only one of a number of injuries sustained, and diagnosis may be deferred as more serious injuries are identified and stabilized. Given the prevalence of mild TBI and blast exposure in combat settings, injured service members may not perceive this injury as concerning and may forgo or postpone medical evaluation.[6] Research has shown that more than half (57%) of those sustaining probable mild TBI while deployed to Iraq or Afghanistan did not pursue medical evaluation for this condition.[1] Beyond the acute setting, diagnosis of mild TBI may remain challenging. Symptoms subsequent to a concussion are similar to those experienced with several common psychiatric conditions, such as PTSD and depression, thus further complicating diagnosis.[6,9]

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In an effort to better detect those with mild TBI, the Department of Defense (DoD) and Department of Veterans Affairs (VA) have instituted screening protocols to be used at the time of initial injury and at various times thereafter. Furthermore, OEF/OIF veterans are screened as part of their initial evaluation when first receiving care within the Veterans Health Administration system.[15] With education and supportive care, the majority of those sustaining mild TBI make a complete recovery.[10] Of the total number of diagnosed cases of TBI reported by the DVBIC since 2000, approximately 20% were moderate or severe.[11] Although these cases occur less frequently than mild TBI, their impact should not be underestimated. Treatment of moderate to severe TBI begins with stabilization followed by continued supportive care, interventions, and medical evacuation from the field as indicated by the underlying injury and condition. Early treatment is often multidisciplinary and may require a variety of medical specialists.[16] As recovery continues, rehabilitation becomes the focus of treatment, drawing upon the expertise of various health professionals who

can assist the patient in optimizing functional abilities. Patients with moderate or severe TBIs may have residual impairments affecting a wide range of brain functions, such as cognition, communication, emotion, memory, social behavior, and/or motor function.[5]

## Psychological Issues and Military Service

Military service is potentially stressful with many contributing factors. In a 2008 survey of more than 28,000 active duty service members, 27% reported high levels of work-related stress during the previous year. Deployment and separation from family were the most frequently identified stressors. Other major stressors were increasing work responsibilities and the challenge of balancing these demands with family needs. Approximately one-quarter of nondeployed (24.6%) and deployed (28.7%) service members experienced high levels of work stress.[17,18] However, those who experience combat are at increased risk for mental health issues.[17-19]

**In 2003, the DoD initiated the Post-Deployment Health Assessment (PDHA), a process designed to evaluate a service member's overall health, to address health concerns, and to arrange appropriate referrals following deployment.**

Combat exposure has been associated with several mental health conditions, such as depression, anxiety, and PTSD. Among Army and Marine Corps personnel, the prevalence of screening positive for one of these three mental health conditions was higher for those who had been deployed to Afghanistan or Iraq, compared with the corresponding prevalence for those who were not deployed. The prevalence for those deployed to Iraq (up to 17%) was greater than the prevalence for those deployed to Afghanistan (11%), consistent with the higher degree of combat exposure experienced by troops in Iraq. In contrast, the prevalence of these mental health disorders was lowest in those who were screened at baseline before deployment (9%).[19]

Shortly after the start of OIF in 2003, the DoD initiated the Post-Deployment Health Assessment (PDHA), a process designed to evaluate a service member's overall health, to address health concerns, and to arrange appropriate referrals following deployment. The PDHA is administered either immediately before return to the United States or within 30 days after return. The PDHA is conducted using a questionnaire in conjunction with a provider interview. Among the questions in the PDHA are items used to screen for mental health conditions, such as PTSD and depression.[20,21] Of Army soldiers and Marines screened during the first year of PDHA implementation, mental health concerns were identified in 19% of those returning from Iraq and in 11% of those who had been deployed to Afghanistan.[20] These findings are consistent with previous research showing a relationship between combat exposure and postdeployment mental health problems.[19]

In 2005, the DoD expanded its postdeployment assessment process to include a second evaluation. This Post-Deployment Health Reassessment (PDHRA) is administered to service members three to six months after their return home and is designed to screen for problems that may have developed since the PDHA was completed. This survey is generally similar to the PDHA and is again teamed with an interview by a health care provider. The PDHRA offers

another opportunity to identify mental health issues and to connect affected service members with appropriate referrals and resources.[22] Research assessing the utility of this second assessment has shown that it does indeed identify a large number of individuals at risk for mental health conditions who were not identified at the time of the PDHA. Among active duty soldiers returning from Iraq, the prevalence of mental health risk increased from 17% on the PDHA to 27% at the time of the PDHRA. The increase was even more significant for reserve personnel, among whom the prevalence of mental health risk doubled over the same period, from 18% to 36%. Although this marked increase in the prevalence of mental health risk among reserve personnel may be in part due to increased reporting in this population, these findings do suggest that the postdeployment period may pose special challenges for reserve personnel as they return to civilian life.[23]

Despite the frequency with which service members experience symptoms of mental health disorders, a minority pursue evaluation or treatment for these concerns, even when they are severe enough to impair function. Of combat troops identified as having possible depression, generalized anxiety, or PTSD, only 23% to 40% received professional help. Furthermore, fewer than half were interested in mental health care. Several reasons were offered for their reluctance; however, the most commonly cited concerns centered on the possibility of career damage or stigma.[19] Overall, these findings suggest that a sizeable number of service members go without needed treatment. Instead, they live with the daily struggle of such conditions as PTSD, anxiety, and depression. There is evidence that service members are interested in reintegration services and information to help them adjust to civilian and community life.[24]

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## Posttraumatic Stress Disorder

Posttraumatic stress disorder (PTSD) is a type of anxiety disorder that develops following an extreme event in which one either directly experiences or observes circumstances that threaten or lead to grave harm. This traumatic event is experienced with a profound sense of fear, helplessness, and/or horror.[25,26]

Persons who develop PTSD may experience a number of different symptoms that generally fall into three categories. The first group of symptoms is *intrusive recollections*. Within this category are symptoms in which the individual re-lives the traumatic event, often in the form of recurrent thoughts, memories, dreams, or flashbacks. Also, he or she may feel emotional and/or physical distress when facing reminders of the event. The category of *avoidant/numbing* symptoms includes efforts to avoid reminders of the traumatic event, feelings of detachment from activities and relationships, and difficulties with emotional expression. The third category includes *hyperarousal* symptoms, such as sleep difficulties, anger or irritability, and hypervigilance.[25,26]

During combat, military personnel may encounter a number of traumatic events, such as being fired upon, being attacked, or witnessing death.[19] Therefore, it would be expected that those deployed to combat zones would be more likely

to experience PTSD than people in civilian settings. Less than 4% of adults under the age of 54 years experience PTSD in a given year in the United States.[27] The baseline pre-deployment prevalence of PTSD among military members is similar to this figure. However, research has confirmed that deployment and combat exposure are associated with a higher prevalence of PTSD symptoms.[19] The majority of soldiers serving in Iraq are involved in combat events that could cause significant trauma.[23] Following OIF deployment, 12% to 13% of Army soldiers and Marines reported symptoms of PTSD that were significant enough to impair daily function.[19]

Not only has combat experience been associated with PTSD, but also there appears to be a relationship between degree of combat experience and PTSD symptoms. Among troops serving in Iraq and Afghanistan, the prevalence of PTSD symptoms was positively associated with the number of firefights experienced during combat. Furthermore, being wounded also increased one's odds of reporting PTSD symptoms after deployment.[19] Even more than combat experience, killing someone or being responsible for killing someone was a significant predictor of PTSD symptoms.[28]

**Following OIF deployment, 12% to 13% of Army soldiers and Marines reported symptoms of PTSD that were significant enough to impair daily function.**

Symptoms of PTSD may develop or worsen over time and affect members of military components in varying proportions. Studies of PDHA/PDHRA data have shown that 12% to 17% of active duty members and 13% to 25% of reserve component personnel meet screening criteria for PTSD, with higher prevalence seen at the time of the PDHRA.[23] Given these findings, it is wise to be mindful of this mental health disorder and to consider it as a potential problem for military personnel beyond the immediate postdeployment period, so that appropriate treatment can begin.

VA and the DoD have developed a Clinical Practice Guideline to be used by providers caring for patients with PTSD. This guideline highlights the importance of PTSD prevention, diagnosis, and treatment and recommends steps to be considered during each of these phases of care to optimize outcomes. There are several types of treatment available for the management of PTSD, such as psychotherapy and medication. This guideline reviews the evidence related to these various treatments, with recommendations made on the basis of this evidence and expert consensus.[29]

## Association between PTSD and TBI

In addition to the physical and cognitive impairments attributed to mild TBI, research has suggested a potential link between this injury and PTSD. In one study, prevalence of PTSD among soldiers returning from Iraq was markedly higher for those reporting mild TBI during deployment, compared with the corresponding prevalence for those who did not report this injury. Of soldiers who sustained mild TBI with loss of consciousness, 44% screened positive for postdeployment PTSD symptoms. Of those whose injury caused mental status changes such as confusion, 27% met these same PTSD screening criteria. PTSD symptoms were less common among those who sustained injuries other than

mild TBI (16%) or who were uninjured during deployment (9%).[12] Although these findings support an association between mild TBI and PTSD, further research is needed to clarify this potential relationship.

## Depression

According to the American Psychiatric Association, major depression is a condition in which one experiences at least two weeks of sadness, depressed mood, or loss of interest or pleasure in daily activities.[25] Depression may result in a number of physical symptoms, such as appetite or weight changes, sleep disturbances, and/or decreased energy. Cognitive disturbances may also be present, such as a diminished ability to think or concentrate and indecisiveness. Depressed persons may also have feelings of worthlessness or inappropriate guilt and/or recurrent thoughts of death. At its most severe, depression may culminate in suicidal ideation and attempted or completed suicide.[25,30]

**Symptoms of depression may take time to develop and may not fully manifest or be reported until months after deployment.**

In the United States, approximately 5% of adults have major depressive disorder in a given year.[31] Depression may be even more common in the military, with 21% of active duty service members reporting feelings of depression that warranted further evaluation in a 2008 survey.[17] Among those deployed in OEF or OIF, 14% met screening criteria suggestive of depression.[1]

Recent research suggests a relationship between combat exposure and the subsequent development of depression. In a large longitudinal study, the proportion of service members who were exposed to combat in OEF/OIF and who developed depression was greater than the proportion of those who were not deployed and who developed depression. In this study, deployment in and of itself did not appear to be the contributing factor, because the prevalence of new-onset depression was lowest among those who were deployed but who did not experience combat.[32]

Like the symptoms of other mental health conditions, symptoms of depression may take time to develop and may not fully manifest or be reported until months after deployment. Of routinely screened personnel returning from Iraq, the prevalence of depression among active duty members more than doubled from the time of the PDHA to the PDHRA administered several months later. The prevalence of screening positive for depression nearly tripled during this same time period for reserve component personnel.[23,b] This once again illustrates the need to consider the possibility of depression well beyond the immediate postdeployment period.

The Department of Veterans Affairs and the Department of Defense have developed a Clinical Practice Guideline for Management of Major Depressive Disorder. This guideline is intended to provide clinicians with the latest

b Among active duty personnel, the prevalence of screening positive for depression on the PDHA was 4.7%, compared with 10.3% several months later on the PDHRA. A similar trend was seen among reserve component personnel, in whom prevalence increased from 3.8% to 13% during a similar postdeployment period.

information so that they may make informed treatment decisions. It also outlines the various available treatment options for those with depression and reviews the evidence and/or consensus supporting each approach.[30]

## Suicide

More people die by suicide across the world than in war, terrorist activities, and homicides combined.[33] In 2000, in the United States alone, suicide was the 11th leading cause of death. Historically, the suicide rate has been lower in the military than among civilians, but in 2008 the suicide rate in the Army (20.2 suicides per 100,000 population) exceeded the age-adjusted rate of 19.2 suicides per 100,000 population.[33]

**Suicide is the fourth leading cause of death among people aged 25 to 44 years but is the third leading cause of death among Marines.**

American troops are taking their own lives in the largest numbers since records began to be kept in 1980. From January through November 2009, the Army reported 102 confirmed suicides and 45 suspected suicides among its active forces. Another 71 suicides were reported among the reserve component not on active duty, 41 of those confirmed and 30 still under investigation. This is a sharp rise from the same period in 2008, which saw 127 suicides among the active forces and 50 in the reserve component. Later in November 2009, 47 suicides in the Navy, 34 in the Air Force, and 42 in the Marine Corps were reported. More troubling is comparing this trend to that of the civilian population in the United States; suicide is the fourth leading cause of death among people aged 25 to 44 years but is the third leading cause of death among Marines.[34]

The high rate of suicides and suicidal behavior in the services needs to be seen in the larger context of mental health throughout the entire force. The challenge is to address the whole mental health landscape, both in theater and at home, and not just exclusively with PTSD and TBI. That is a challenge further exacerbated for the reserve component by its geographic dispersal, its barriers to health care delivery, and its members' dual-role lives as warriors and civilian employees.

Although the stresses of the current war, including long and repeated deployments and posttraumatic stress, may be potential contributors, suicide behavior is a complex phenomenon. Several aspects make understanding suicide and preventing suicide particularly challenging, but one of the most challenging aspects is the multitude of factors that underlie and precede the event. Suicide is the visible manifestation of a much larger set of physical, mental, and spiritual stressors.

Males are four times more likely to die from suicide than females. Females reported attempting suicide three times more often than males. Suicide rivals the battlefield in its toll on US military. The average age of soldiers dying by suicide is 21; most of them are white males. Of these service members, 35% have never been deployed. The predominant factors reflected in suicidal behavior among service members are relationships, employment, and substance abuse.[33]

A strategy for fighting suicidal behavior is the DoD's attempt to build psychological resilience in individuals. The Mental Health Advisory Team (MHAT) is composed of senior Army behavioral health professionals who monitor the Army's suicide rate and who study the reasons that soldiers engage in suicide. In 2004, the MHAT's report indicated that among soldiers who screened positive for depression, anxiety, or PTSD, 53% reported that their unit leadership might treat them differently, and 54% reported that they would be seen as weak. The perception of stigma acts as a deterrent to seeking care for many soldiers. When soldiers fail to seek help when it is necessary, the general outcome is emotional degeneration leading to poor work performance and possibly to suicidal behavior.[33]

## Substance Abuse

As discussed in earlier sections, military deployment is associated with significant stress. Recent research suggests that some personnel use substances such as alcohol and tobacco to help manage the stressors associated with deployment and military service.[18,c] Among active duty service members with high levels of combat exposure, as many as 45% reported drinking for relaxation, 24% drank to forget problems, and 21% drank to cheer up. Likewise, as many as 31% began a smoking habit to relieve stress, 33% to help relax, and 29% to relieve boredom. Since 1980, progress has been made toward decreasing substance use among active duty personnel.[18] However, substance abuse remains a concern for the military.[17,18]

### *Alcohol*

Alcohol use continues to pose a significant problem for the armed services, with 20% of surveyed active duty service members reporting heavy drinking.[17,18] Compared with civilians aged 18 to 35 years, active duty military in the same age group reported heavy drinking in a greater proportion.[d] Binge drinking was also a serious problem, with nearly half (47%) of all active duty personnel engaging in this behavior.[18]

**Combat experience has been associated with an increased risk of developing alcohol misuse and its associated problems, such as impaired driving, compromised work performance, or difficulties with social interaction.**

Research suggests a link between combat deployment and drinking behavior. Combat experience has been associated with an increased risk of developing alcohol misuse and its associated problems, such as impaired driving, compromised work performance, or difficulties with social interaction.[35,36] In a large prospective study, this was found to be true particularly for members of the reserve componentand for the youngest service members, such as those born after 1980.[35] The same characteristics of alcohol misuse and associated problems are true for service members returning from deployment.[37] Among

c According to the 2008 DoD Survey of Health-Related Behaviors among Active Duty Personnel, 25% of women and 37% of men reported having a drink to cope with stress. Similarly, 28% of men and 21% of women used cigarettes for this purpose.[16]

d According to the 2008 DoD Survey of Health-Related Behaviors among Active Duty Personnel, 26% of active duty personnel aged 18 to 25 years reported heavy drinking, compared with 16% of civilians in the same age group. Among personnel aged 26 to 35 years, 18% reported heavy drinking, compared with 11% of age-contemporary civilians.

soldiers returning from Iraq, those with greater degrees of combat exposure were more likely to report alcohol misuse on a routinely used screening instrument.[36] Furthermore, certain types of combat experiences were more strongly related to alcohol misuse and related problems. For example, personnel exposed to combat events in which they feared being killed or injured were more likely to report alcohol misuse after deployment. Those who witnessed atrocities, such as brutal treatment of noncombatants, were more likely to report post-deployment behavioral problems related to alcohol misuse.[36] Given these findings, it is important to be especially mindful of the risk of alcohol misuse among those who return from combat deployment to better identify those in need of evaluation and treatment.[36]

**Although post-deployment screening may help detect alcohol misuse among military personnel, data suggest a need to improve the referral process used to connect those with alcohol problems to needed services.**

Although post-deployment screening may help detect alcohol misuse among military personnel, data suggest a need to improve the referral process used to connect those with alcohol problems to needed services. In a routine post-deployment assessment of more than 80,000 troops returning from Iraq, 12% of active duty members and 15% of reserve component members met screening criteria suggestive of alcohol misuse on the PDHRA. However, only 0.2% of those active duty members who were identified and only 0.6% of those National Guard/Reserve personnel who were identified were referred for further substance abuse evaluation and treatment.[23]

### *Drugs*

Compared with the use of tobacco and alcohol, the use of illicit nonprescription drugs, such as marijuana, cocaine, and heroin, appears to be a less common problem among active duty military personnel. Approximately 2% of those surveyed in 2008 reported such use within the past month. This prevalence remained essentially unchanged from the prior six-year period.[17,18] Military drug testing may in part account for this lower observed prevalence of illicit substance misuse.[17] Nonprescription drug misuse (illicit drug use) is less prevalent among military personnel than among civilians (2% vs 12%). However, the misuse of prescription drugs (legal drug use) is three times as common among service members than among civilians (12% vs. 4%).[18]

Misuse of prescription drugs includes such behaviors as taking drugs that have not been prescribed or taking prescribed medications in an intentionally inappropriate manner.[17,18] Among active duty military personnel, the most commonly misused prescription drugs are pain relievers, tranquilizers, and muscle relaxants.[18] An increase in reported prescription drug misuse has been observed during the past six years. On the basis of 2008 survey results, 11% of active duty military members reported engaging in this behavior within the previous month, in contrast to nearly 4% in 2005.[17,18] Given that survey questions regarding drug use were modified and refined during the 2005 and 2008 surveys, it is uncertain how much of this observed increase in prevalence is due to actual misuse of prescription drugs rather than to differences in reporting.[17,18] Nonetheless, this is an important finding. Furthermore, unlike

the relationship between combat and alcohol misuse, combat deployment does not appear to be related to the prevalence of drug use.[17,35,36]

### *Tobacco*

Cigarette smoking continues to damage health and shorten lives. It has been estimated that annually more than 443,000 deaths in the United States are due to direct and indirect exposure to cigarette smoking. The estimated economic costs to our country are equally astounding, with more than $193 billion spent each year in direct medical care costs and lost productivity.[38]

The prevalence of smoking within the military has decreased during nearly three decades. However, it is still a common problem, with 31% of active duty service members reporting cigarette use in 2008. Furthermore, nearly one-third (30%) of personnel who smoked began their habit after beginning their military careers.[18]

**Nearly one-third (30%) of personnel who smoked began their habit after beginning their military careers.**

Research has examined the relationship between smoking behavior and deployment in OEF or OIF. In one large study, deployment was associated with an increased risk of new-onset smoking as well as recidivism among former smokers. Although the prevalence of new-onset smoking was low for both deployed (2.3%) and nondeployed (1.3%) groups, recidivism was a more common occurrence. Nearly 40% of former smokers who were deployed resumed their smoking habit, in contrast to 29% of former smokers who were not deployed. Furthermore, the odds of resuming smoking were increased for those who were deployed more than once or for longer than nine months. Beyond deployment, this study also found that those service members who were exposed to combat were more likely to begin a new smoking habit or to resume a previous one, compared with the likelihood of those who did not experience combat.[39] Overall, the number of service members who begin smoking or who return to smoking after entering the military is larger than the number of civilians, and the risk of these service members doing so may be increased by deployment and combat.[18,39]

Despite the continued problem of smoking in the armed services, it is encouraging that the percentage of military members smoking greater than one pack per day has decreased since 1980 from 34% to 10%.[18] Furthermore, in 2008, smoking cessation was on the agenda for many active duty service members, with nearly two-thirds (62%) reporting plans to stop smoking in the near future.[18] Although deployment has been linked with new and resumed smoking, it is important to note that during a three-year period, 8% of those deployed to Iraq or Afghanistan still managed to quit smoking, as did 10% of those who did not deploy.[39]

## Women's Issues

As of 2007, approximately 14% of all active duty military personnel were women, as were nearly 18% of reserve component personnel.[40] Although men and women contend with some of the same stressors during and after military

service, women who serve in the current conflicts may experience a number of additional stressors attributable to their gender.[41] In a 2008 survey, 39% of female active duty military personnel attributed high levels of stress to being a female service member.[18]

Women serving in OEF and OIF are encountering greater degrees of combat exposure.[41,42] The increase in the professional scope of female personnel broadens their range of work settings and increases their risk of being in a location that is subject to attack.[41,42] Also, with blurred battle lines and unconventional attacks, women are more frequently in the line of fire.[41,42] DoD statistics as of July 2010 reveal that in the OEF/OIF conflicts, 129 female military members have died and 707 have been wounded in action.[7]

**Research has revealed an association between several mental health conditions and military sexual trauma.**

As more women experience greater degrees of combat, research is being conducted to study the effects of deployment on subsequent mental health issues. On the basis of data from the PDHA and from the VA patient population, similar proportions of male and female service members experience mental health concerns after deployment.[20,43] Although overall prevalence of mental health conditions may be similar, in caring for female military members and veterans it is important to consider the impact of gender on the experience and manifestation of specific issues and disorders, such as military sexual trauma, depression, and PTSD.

Military sexual trauma (MST) includes "severe or threatening forms of sexual harassment and sexual assault sustained in military service."[44] MST has been more commonly identified among women than men.[44-46] For example, in a 2002 survey, 8% of female active duty service members reported sexual coercion in the previous year, and 3% experienced sexual assault, compared with 1% of men who reported each of these types of MST. Although the reported prevalence of these offenses had decreased since a previous survey in 1995, this issue remains of concern.[45] The prevalence of MST is an important consideration in the provision of clinical care to female veterans. Approximately 15% of female OEF/OIF veterans cared for under the Veterans Health Administration (VHA) have met screening criteria for MST, in contrast to less than 1% of males.[46]

Recent research has revealed an association between several mental health conditions and MST. Among male and female OEF/OIF veterans cared for within the VHA, those with a history of MST were more likely to have mental health conditions than were those without MST. Furthermore, women with MST had nearly twice the prevalence of PTSD, depression, and anxiety disorders, compared with the corresponding prevalence for women without MST. The most striking difference was seen in the occurrence of alcohol and substance abuse, which was nearly three times as prevalent among female veterans with MST,

compared with the prevalence for those without MST.[46,e] Given the prevalence of MST and its associated mental health problems, it is an important factor to consider in the psychological well-being of female OEF/OIF veterans.

With regard to the general occurrence of postdeployment psychological conditions, male and female OEF/OIF veterans may experience depression and PTSD in differing degrees.[32,44] Research has shown that deployed female service members have a greater prevalence of depression than do males. Of those experiencing combat in Afghanistan or Iraq, women were nearly three times as likely to meet screening criteria for new-onset depression, compared with the likelihood of men (16% vs. 6%).[32] Among OEF/OIF veterans receiving care within the VA healthcare system, nearly half (48%) of female veterans were identified as having possible depression by standard screening procedures, compared with 39% of men. In contrast, these female OEF/OIF veterans were found to have a lower prevalence of PTSD than their male counterparts (21% vs. 33%). It is unclear, however, if this difference in PTSD prevalence is due to differing degrees of combat exposure.[44] In female OEF/OIF veterans, older age was associated with greater prevalence of PTSD and depression.[47] Much remains to be learned about the mental health needs of female OEF/OIF veterans. This is an area of increasing concern as the number of women returning from Iraq and Afghanistan continues to grow.[44]

**The prevalence of depression and generalized anxiety among military spouses is comparable with that observed among similarly screened service members who have experienced combat duty in Afghanistan or Iraq.**

## Family Issues

### *Psychological Needs of Military Spouses*

The families of our service members share in the stress of military service and deployment. Studies of military spouses suggest that these spouses endure some of the same mental health conditions experienced by service members.[48,49] In a 2003 study, emotional issues and stress posed a challenge for nearly one-quarter (22%) of surveyed spouses. Depression and anxiety were commonly identified conditions, with 12% to 17% of spouses meeting standard screening criteria for these mental health conditions. For many of these spouses, mental health issues interfered with their ability to function in relationships and to perform daily activities.[48] On the basis of this study, the prevalence of depression and generalized anxiety among military spouses is comparable with that observed among similarly screened service members who have experienced combat duty in Afghanistan or Iraq.[19,48] Additional research has found deployment duration to be associated with the diagnosis of several mental health conditions among military spouses. The greatest number of cases of conditions such as anxiety, acute stress reaction, depressive disorders, and sleep disorders were diagnosed among wives whose spouses were deployed for longer than 11 months, in comparison to the corresponding number of cases among spouses of those deployed for shorter periods or not at all.[49]

e Among female veterans who reported experiencing MST, the prevalence of PTSD was 51% , compared with 22% in those without MST. The prevalence of depression was 56% for those with MST and 30% for those without MST. The prevalence of anxiety disorders was 29% in those with MST and 17% in those without MST. Finally, 14% of women with MST experienced alcohol and/or substance abuse, in contrast to 5% of those without MST.

Although a similar proportion of service members and spouses experience common mental health problems, spouses may be more apt to pursue mental health treatment. In the previously described study of military spouses, more than two-thirds (68%) of those whose anxiety or depression was severe enough to impair daily functioning obtained help from a health care professional.[48] This is in contrast to 23% to 40% of similarly affected service members, among whom stigma was identified as a formidable barrier to seeking care.[19,48] Although stigma was still a concern for nearly one-quarter of military spouses (21% to 22%), other issues such as financial concerns, limited time, and scheduling difficulties were more commonly cited as obstacles to treatment.[48] It is important to note that many of these spouses received all of their mental health care from primary care practitioners rather than mental health specialists. This may be due in part to the limitations of the current military system that requires spouses to seek this specialty care within the civilian sector rather than on base.[48]

**Children aged 11 to 17 years from military families with a deployed parent were more likely to have emotional problems than were average US children.**

### *Psychological Needs of Military Children*

A large proportion of service members are parents who leave behind children when deployed. Approximately 43% of active duty members and nearly 42% of reserve component personnel have children. According to a 2007 report, nearly 2 million children had a parent serving in the military.[40]

Recent studies have explored how deployment of a parent affects the functioning of children in a variety of contexts, including family, school, and social settings.[50,51] From these studies, several key findings have emerged. First, children aged 11 to 17 years from military families with a deployed parent were more likely to have emotional problems than were average US children.[50] Of these children, nearly one-third (30%) experienced anxiety symptoms. Children older than three years were more likely to have attention difficulties and aggressive behaviors when parents were deployed.[52] Furthermore, as total time of parental deployment increased, the number of difficulties experienced by children during and after deployment increased as well.[50,53]

Gender and age may play a role in how children experience and adjust to parental deployment.[50,51] Compared with boys, girls aged 11 to 17 years reportedly encounter more difficulties adjusting to both the deployment and the return of a deployed parent.[50] Furthermore, boys and girls may express deployment-related problems differently. On the basis of observations of teachers and staff, girls tended to exhibit more physical symptoms and signs of depression. However, boys had a more external focus with more frequent anger and aggressive behavior.[51] In addition to gender, age appears to affect children's functioning during the deployment and the return of a parent, with the most difficulties encountered by those in adolescence.[50]

Children's abilities to function in academic and other settings have been found to be related to the mental health of their nondeployed caregivers.[50,51] Poor caregiver mental health has been linked to greater problems among their children.[50,51] Recent studies show that parenting stress is the most significant

predictor of child psychosocial functioning during parental deployment.[54] These findings underscore the importance of ensuring adequate mental health care for military spouses and families as well as for military personnel.

## Interpersonal Conflict and Domestic Violence

Research has shown that interpersonal conflict is an important issue for service members returning from deployment. Furthermore, concern for conflict becomes more prevalent with time.[23] During several months following return from deployment to Iraq, the percentage of troops affected by interpersonal conflict quadrupled among active duty members (from 3.5% to 14%) and increased more than five-fold among reserve personnel (from 4.2% to 21.1%). These military members reported concerns with conflict in their relationships with friends and co-workers as well as with spouses and family.[23]

**In 2008, nearly one in five service members (18%) reported large amounts of stress within their families or relationships with significant others.**

Family stress is commonly experienced by active duty members of the armed services. In 2008, nearly one in five service members (18%) reported large amounts of stress within their families or relationships with significant others.[18] Furthermore, high family stress was nearly twice as prevalent among those who had high cumulative levels of combat exposure, compared with the prevalence among those with the lowest levels of combat experience (23% vs. 14%). In a recent study of OEF/OIF veterans, three-fourths of those who were married or living with a partner reported some type of family problem within the previous week.[55] Although family stress may be experienced by all service members, these data suggest that those who are deployed with combat exposure may be at even greater risk for high levels of family stress.[18]

One of the most severe manifestations of interpersonal conflict and/or family stress is intimate partner violence. According to the Centers for Disease Control and Prevention, intimate partner violence (IPV) is defined as "physical, sexual, or psychological harm by a current or former partner or spouse."[56] In addition to physical injury, victims of intimate partner violence report poorer overall health status and numerous physical and mental health problems.[57,58]

In 2003, nearly 16% of soldiers screened before deployment were identified by self-report as having been engaged in IPV during the preceding 12 months. A number of factors were associated with an increased risk of IPV in this group. These factors included greater degrees of stress, less relationship satisfaction, younger age, and less education. A strong association was also observed between reported alcohol misuse and IPV.[59]

On the basis of a 2005 literature review, studies examining IPV perpetration by male veterans and active duty service members have produced a broad range of prevalence estimates (13% to 58%).[60] The variability in these estimates is due in part to differences in measures of IPV, sources of data, period studied, and characteristics of the study population, such as the presence of concurrent substance abuse or psychological conditions.[60] At this point in time, little is known about the issue of IPV among military personnel returning from Iraq

and Afghanistan. However, one small study that included OEF/OIF veterans suggested those with PTSD are at increased risk for perpetrating and experiencing IPV, compared with the risk for those without PTSD.[61] Further research in this area is needed.

Intimate partner violence is an important issue in and of itself. However, its presence in a family has also been found to be a risk factor for child abuse. During a six-year period ending in 1995, Army families with a documented occurrence of spouse abuse had two times the risk of subsequent confirmed child abuse, compared with the risk of families without spouse abuse.[62] Therefore, it is important to consider intimate partner violence and child maltreatment within the larger context of family stress and violence.

**Population-level data have shown an increase in child maltreatment rates not only during periods of increased deployments but also during times in which greater numbers of personnel return home.**

Studies have suggested a relationship between parental deployment and child maltreatment.[63,64] Among Army families with a confirmed history of child maltreatment, maltreatment rates were greater during periods of deployment, compared with rates during nondeployment.[63] During parental deployment periods, maltreatment rates were 42% higher and rates of more severe degrees of maltreatment were more than 60% higher, compared with the corresponding rates in periods in which the enlisted parent remained home. Furthermore, during times of deployment, female nonmilitary spouses perpetrated child maltreatment at a rate more than three times greater than when the military spouse was home.[63] Population-level data have shown an increase in child maltreatment rates not only during periods of increased deployments but also during times in which greater numbers of personnel return home.[64] These studies illustrate the potentially far-reaching and serious effects of military service on family members and suggest a greater need for family support during these potentially stressful times.[63,64]

## Conclusion

This chapter has provided an overview of issues faced by many military members who have been deployed to Iraq and Afghanistan. Although these issues have been described as individual topics, it is important to note that these conditions may occur together. For example, in a postdeployment survey of service members and veterans of OEF/OIF, approximately 5% experienced symptoms of depression, PTSD, and TBI concurrently.[1] Likewise, individuals may be challenged by more than one mental health condition at the same time. Of OEF and OIF veterans first receiving care within the VA system, 25% had at least one mental health diagnosis. Of this group, 29% had two separate mental health diagnoses, and 27% had three or more—meaning greater than half of those with diagnosed mental health conditions had more than one disorder.[43] Furthermore, because mental health problems may take time to develop and to manifest, it is important to consider their presence beyond the immediate postdeployment period and to ensure that service members have adequate follow-up and access to mental health care.[23]

There are many indications that the demands on our health care system are likely to increase as more service men and women return home and require care. For example, of more than 220,000 OIF veterans, 31% received outpatient care for a mental health concern during the first year after their return home from Iraq.[20] This is coupled with an overall steady increase in mental health service use among Army and Marine personnel.[20] This amplifies the importance of ensuring that effective services are available to keep pace with these growing demands.[20]

Our service members and their families have made sacrifices to serve us in the current conflicts. As they return home, it is important that these men and women have the resources and support that they need to heal both the physical and the "invisible" wounds that have resulted from their brave service. In order to provide for the health needs of our military, it is important to first understand more about the system that drives and delivers this care. The chapter that follows will serve as a guide as we learn about the workings of the military health care system.

**As they return home, it is important that these men and women have the resources and support that they need to heal both the physical and the "invisible" wounds that have resulted from their brave service.**

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