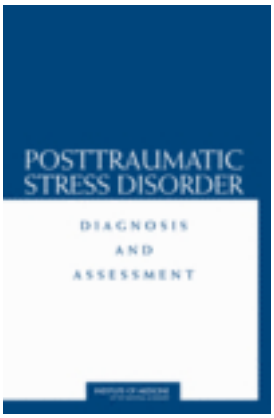

Posttraumatic Stress Disorder: Diagnosis and Assessment

Subcomittee on Posttraumatic Stress Disorder of the Committee on Gulf War and Health: Physiologic, Psychologic, and Psychosocial Efffects of Deployment-Related Stress

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POSTTRAUMATIC STRESS DISORDER

DIAGNOSIS AND ASSESSMENT

Subcommittee on Posttraumatic Stress Disorder

of the

Committee on Gulf War and Health: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress

Board on Population Health and Public Health Practice

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Willing is not enough; we must do."
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This report has been reviewed in draft form by persons chosen for their diverse perspectives and technical expertise in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **ELAINE L. LARSON, PhD, RN.** Appointed by the National Research Council, she was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the author committee and the institution.

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SUMMARY

In response to growing national concern about the number of veterans who might be at risk for posttraumatic stress disorder (PTSD) as a result of their military service, the Department of Veterans Affairs (VA) asked the Institute of Medicine (IOM) to conduct a study on the diagnosis and assessment of, and treatment and compensation for PTSD. An existing IOM committee, the Committee on Gulf War and Health: Physiologic, Psychologic and Psychosocial Effects of Deployment-Related Stress, was asked to conduct the diagnosis, assessment, and treatment aspects of the study because its expertise was well-suited to the task. The committee was specifically tasked to "review the scientific and medical literature related to the diagnosis and assessment of PTSD, and to review PTSD treatments (including psychotherapy and pharmacotherapy) and their efficacy." In addition, the committee was given a series of specific questions from VA regarding diagnosis, assessment, treatment, and compensation. The questions pertaining to diagnosis and assessment and the committee's responses are provided in Appendix A. This report is a brief elaboration of the committee's responses to VA's questions, not a detailed discussion of the procedures and tools that might be used in the diagnosis and assessment of PTSD.

The committee decided to approach its task by separating diagnosis and assessment from treatment and preparing two reports. This first report focuses on diagnosis and assessment of PTSD. Given VA's request for the report to be completed within 6 months, the committee elected to rely primarily on reviews and other well-documented sources. A second report of this committee will focus on treatment for PTSD; it will be issued in December 2006. A separate committee, the Committee on Veterans' Compensation for Post Traumatic Stress Disorder, has been established to conduct the compensation study; its report is expected to be issued in December 2006.

CHARACTERISTICS OF POSTTRAUMATIC STRESS DISORDER

PTSD is a psychiatric disorder that can develop after the direct, personal experiencing or witnessing of a traumatic event, often life-threatening. The essential characteristic of PTSD is a cluster of symptoms that include:

- Re-experiencing—intrusive recollections of a traumatic event, often through flashbacks or nightmares,
- Avoidance or numbing—efforts to avoid anything associated with the trauma and numbing of emotions,
- Hyperarousal—often manifested by difficulty in sleeping and concentrating and by irritability.

If those symptoms last for a month or less, they might be indicative of acute stress disorder; however, for a diagnosis of PTSD to be made, the symptoms must be present for at least a month and must cause "clinically significant distress and/or impairment in social, occupational, and/or other important areas of functioning."

CURRENT DIAGNOSTIC CRITERIA

Although there is a long history of descriptions of posttraumatic syndromes, the modern era of diagnosing PTSD began in 1980 with the introduction of PTSD in the third edition of APA *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-III*). Formal recognition of PTSD led to a large body of systematic research on its features and research findings led to modification and refinement of the diagnostic criteria. But many of the diagnostic criteria from *DMS-III* are largely unchanged in the latest revision of the fourth edition of the diagnostic manual, *DSM-IV-TR* (hereafter referred to as the *DSM-IV*).

The evidence-based diagnosis of PTSD, according to *DSM-IV* (see Box 2.1) has several components: exposure to a traumatic event, intrusive re-experiencing of the event, avoidance and numbing,

hyperarousal, duration of symptoms for at least a month, and clinically significant distress or impairment that was not present before the trauma.

CLINICAL DIAGNOSIS AND ASSESSMENT

Numerous traumatic events or stressors are known to influence the onset of PTSD; however, not everyone who experiences a traumatic event or stressor will develop PTSD. Its development depends on the intensity of the traumatic event or stressor and on a host of risk and protective factors occurring before, during, and after the trauma.

After a traumatic event, there is substantial variation among patients with regard to both the timing of the onset of symptoms and the types of symptoms. Furthermore, there might be a delay between the onset of symptoms and when the patient seeks help. Patients also vary in how they present to a health professional. For example, a patient might present at a health facility with a physical or psychiatric complaint unrelated to PTSD, and it is only during the course of evaluating or treating the patient for the presenting complaint that symptoms of PTSD can be identified and a diagnosis made. In other cases, a patient might present to a mental health professional who is conversant with the diagnosis of PTSD and is better able to elicit a narrative of exposure and symptoms; or a family member or other person familiar with the veteran might seek advice from a health professional about coping with a veteran who might be suffering from PTSD. The presenting symptoms and initial diagnostic process are variable and might necessitate a brief or long assessment.

Optimally, a patient is evaluated in a confidential setting with a face-to-face interview by a health professional experienced in the diagnosis of psychiatric disorders, such as a psychiatrist, psychologist, clinical social worker, or psychiatric nurse. The interview should elicit the patient's symptoms, assess the history of potentially traumatic events, determine whether the patient meets the *DSM-IV* criteria for PTSD, determine the frequency and severity of symptoms and the associated disability, and determine whether there are comorbid psychiatric and

medical conditions. It is critical that adequate time be allocated for this assessment. Depending on the mental and physical health of the veteran, the veteran's willingness and capacity to work with the health professional, and the presence of comorbid disorders, the process of diagnosis and assessment will likely take at least an hour and could take many hours to complete.

Unfortunately, many health professionals do not have the time or experience to assess psychiatric disorders adequately or are reluctant to attribute symptoms to a psychiatric disorder. Furthermore, veterans with PTSD might not present to a mental health professional, because they do not attribute their symptoms to a psychiatric disorder, they feel that a stigma is associated with psychiatric illness, they have limited access to such professionals, or for other reasons, such as cost. Therefore, health professionals should be aware that veterans, especially those who have served in war theaters, are at risk for the development of PTSD, but might present with physical or psychiatric complaints that are symptomatic of substance use disorder or other psychiatric conditions. Health professionals should ask all veterans about possible exposure to potentially traumatic events.

A basic component in diagnosing PTSD is determining whether a person has experienced a traumatic event that has led to symptoms indicative of PTSD (see criterion A in Box 2.1). A war environment is rife with opportunities for exposure to traumatic events of many types. Types of traumatic stressors related to war include serving in dangerous military roles, such as driving a truck at risk for encountering roadside bombs, patrolling the streets, and searching homes for enemy combatants, suicide attacks, sexual assaults or severe sexual harassment, physical assault, duties involving graves registration, accidents causing serious injuries or death, friendly fire, serving in medical units, killing or injuring someone, seeing someone being killed, injured, or tortured, and being taken hostage.

ASSESSMENT INSTRUMENTS

The most important consideration in diagnosing PTSD is a systematic, comprehensive approach to obtaining a patient's clinical history in a face-to-face, confidential diagnostic interview. Structured and semi-structured approaches to diagnosing PTSD are also useful, especially in epidemiologic and treatment-outcomes research. Some of the most widely used interview instruments for diagnosing PTSD are the Clinician-Administered PTSD Scale (CAPS), the Structured Clinical Interview for DSM-IV, the PTSD Symptom Scale–Interview Version, the Structured Interview for PTSD, the Diagnostic Interview Schedule IV, and the Composite International Diagnostic Interview.

Structured interviews such as the CAPS, which were developed specifically for diagnosis of PTSD, might take an hour or more to administer, although others, such as the PSS-I, can take less time. There are also several self-report instruments that can be used to help document symptoms and traumatic exposures. These include the Posttraumatic Diagnostic Scale, the Davidson Trauma Scale, and the Detailed Assessment of Posttraumatic Stress (DAPS). Each of the instruments determines what symptoms of PTSD are present, as well as their frequency and intensity.

Although numerous instruments have been developed for the diagnosis and assessment of PTSD, the committee strongly concludes that the best way to determine whether a person is suffering from PTSD is with a thorough, face-to-face clinical interview by a health professional trained in diagnosing psychiatric disorders. Such a health professional will be familiar with the *DSM-IV* criteria for PTSD (which the committee finds are appropriate for diagnosing PTSD) and will use those criteria when diagnosing patients.

1

INTRODUCTION

Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) have resulted in the deployment of hundreds of thousands of US military personnel to Afghanistan and Iraq since 2002. Recent reports note that substantial numbers of returning veterans are seeking mental health services from Department of Veterans Affairs (VA) health facilities. For example, 35% of OIF veterans accessed mental health services in military facilities during their first year after returning from deployment to Iraq. That rate is much higher than the rates after deployment to Afghanistan (OEF) or other deployments, such as Bosnia (Hoge et al. 2006). More than 17% of the US Army soldiers and marines returning from deployment to Iraq screened positively for a mental health problem more than 3 months after their return, and 12% of the returning troops screened positively for posttraumatic stress disorder (PTSD) (Hoge et al. 2004).

Descriptions of soldiers suffering from combat stress after a war go back to ancient Greek texts. However, it is the experiences of military psychiatrists in World War II that were instrumental in spurring the medical profession into the modern era of psychiatric diagnosis. The psychiatric profession, however, did not formally recognize the long-term effects of combat stress as a disorder until decades later. Military psychiatrists felt that psychiatric disorders were more pervasive and serious than they had expected before the war. They also believed, contrary to prevailing views, that psychologic maladjustment could be triggered by an external stressor (Grob 1994). Their influence was felt in classifying different types of mental illness in the first edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*), which was published in 1951 by the American Psychiatric Association (APA).

PTSD attained formal recognition by the psychiatric profession after the Vietnam War. PTSD was formally recognized as a disorder in the *DSM* in 1980 and psychiatric casualties are now seen in the same light as medical casualties, that is, worthy of diagnosis and treatment.

CHARACTERISTICS OF POSTTRAUMATIC STRESS DISORDER

PTSD is a psychiatric disorder that can develop after the direct, personal experiencing or witnessing of a traumatic event, often life-threatening. The essential characteristic of PTSD is a cluster of symptoms that include:

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If those symptoms last for a month or less, they might be indicative of acute stress disorder; however, for a diagnosis of PTSD to be made, the symptoms must be present for at least a month and must cause "clinically significant distress and/or impairment in social, occupational, and/or other important areas of functioning" (APA 2000).

Although the onset typically occurs shortly after exposure to a traumatic event, the lag time between exposure and full manifestation of the condition can be variable and in some cases long; if the onset of symptoms occurs more than six months after the trauma it is referred to as delayed onset. Over the long term, PTSD can also be chronic or recurrent (Friedman 2003). In some cases, PTSD occurs alone, but most people who have PTSD also have other psychiatric disorders, such as major depressive disorder (Black et al. 2004; Kessler et al. 1995), that occur either with or after the development of PTSD.

Numerous traumatic events or stressors are known to influence the onset of PTSD; however, not everyone who experiences a traumatic event or stressor will develop PTSD. Its development depends on the

intensity of the traumatic event or stressor and on a host of risk and protective factors occurring before, during, and after the trauma.

COMMITTEE'S TASK AND APPROACH

In response to growing national concern about the number of veterans who might be at risk for PTSD and other mental health problems as a result of their military service, VA asked the Institute of Medicine (IOM) to conduct a study on the diagnosis and assessment of, and treatment and compensation for PTSD. An existing IOM committee, the Committee on Gulf War and Health: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress, was asked to conduct the diagnosis, assessment, and treatment aspects of the study because its expertise was well-suited to the task. The committee was specifically tasked to "review the scientific and medical literature related to the diagnosis and assessment of PTSD, and to review PTSD treatments (including psychotherapy and pharmacotherapy) and their efficacy." In addition, the committee was given a series of specific questions from VA regarding diagnosis, assessment, treatment, and compensation. The questions pertaining to diagnosis and assessment of PTSD and the committee's responses are provided in Appendix A. This report is a brief elaboration of the committee's responses to VA's questions, not a detailed discussion of the procedures and tools that might be used in the diagnosis and assessment of PTSD.

The committee decided to approach its task by separating diagnosis and assessment from treatment and preparing two reports. This first report focuses on diagnosis and assessment of PTSD. Given VA's request for the report to be completed within 6 months, the committee elected to rely primarily on reviews and other well-documented sources. The committee began its task by reviewing the *DSM-IV* diagnostic criteria for PTSD because they are well-accepted and used by VA's compensation and pension program, as required by the *Code of Federal Regulations* (38 CFR 4.130). *DSM-IV* is also accepted and relied upon by private health-insurance companies, Medicare, Medicaid, and the Social Security Administration.

The committee will produce a second report that will focus on treatments for PTSD; it will be issued in December 2006. A separate

committee, the Committee on Veterans' Compensation for Post Traumatic Stress Disorder, has been established to conduct the compensation study; its report is expected to be issued in December 2006.

ORGANIZATION OF THE REPORT

Chapter 2 examines the clinical approach to the diagnosis and assessment of a patient who might have PTSD, and Chapter 3 highlights some of the instruments that might be used in assessment. Appendix A presents a series of questions posed by the VA about diagnosis and assessment of PTSD and the committee's responses to them. Appendix B discusses an approach to the validation of any disorder and highlights the progress made in establishing PTSD as a disorder. Appendix C provides a brief overview of some of the risk and protective factors that might influence whether a person will develop PTSD.

REFERENCES

APA (American Psychiatric Association). 2000. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association.

Black DW, Carney CP, Peloso PM, Woolson RF, Schwartz DA, Voelker MD, Barrett DH, Doebbeling BN. 2004. Gulf War veterans with anxiety: Prevalence, comorbidity, and risk factors. *Epidemiology* 15(2):135-142.

Friedman MJ. 2003. *Post Traumatic Stress Disorder: The Latest Assessment and Treatment Strategies*. Kansas City, MO: Compact Clinicals.

Grob GN. 1994. *The Mad Among Us: A History of the Care of America's Mentally Ill*. New York: Free Press.

Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. 2004. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine* 351(1):13-22.

Hoge CW, Auchterlonie JL, Milliken CS. 2006. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association* 295(9):1023-1032.

Kessler RC, Sonnega A, Bromet E, Hughes M, et al. 1995. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 52(12):1048-1060.

2

DIAGNOSIS AND ASSESSMENT

Many people are exposed to traumatic events; some of them will experience temporary distress, others acute stress disorder (ASD), and still others will go on to develop posttraumatic stress disorder (PTSD) or other conditions. ASD can be diagnosed only within the first month after a traumatic event (APA 2000). If symptoms persist beyond a month, the person might meet the criteria for PTSD. The criteria for PTSD are listed in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders, Text Revision* (*DSM-IV-TR,* hereafter referred to as the *DSM-IV*) (Box 2.1) and include symptoms of re-experiencing, intrusive recollections of a traumatic event, as through flashbacks or nightmares; avoidance and numbing, efforts to avoid anything associated with the trauma and numbing of emotions; and hyperarousal as manifested by, for example, difficulty in sleeping or irritability (APA 2000).

PTSD symptoms can vary in severity and frequency and can leave patients with an array of disabilities from mildly distressing to severely incapacitating. Although the onset typically occurs shortly after exposure, the lag between exposure and full manifestation of PTSD is variable and in some cases long (Bremner et al. 1996; Bryant and Harvey 2002; Carty et al. 2006; Gray et al. 2004; Green et al. 1990; Op den Velde et al. 1996; Port et al. 2001; Ruzich et al. 2005); if the onset of symptoms occur more than six months after the trauma it is referred to as delayed onset. PTSD can be chronic or recurrent (Friedman 2003). In some cases, it occurs alone, but most people who have PTSD also have other psychiatric disorders, such as major depressive disorder (Black et al. 2004; Kessler et al. 1995), that occur either at the same time as or after the development of PTSD.

This chapter focuses on the diagnosis and assessment of PTSD beginning with the accepted diagnostic criteria for PTSD (Box 2.1) as described in the American Psychiatric Association's *DSM-IV* (APA 2000). The chapter presents additional information that might be useful for a comprehensive assessment of a PTSD patient, such as determining comorbidity, symptom severity, functional status, and neuropsychologic impairments. The chapter concludes with a comment about biomarkers that might be of future use in the diagnosis of PTSD.

CURRENT DIAGNOSTIC CRITERIA

Although there is a long history of descriptions of posttraumatic syndromes, the modern era of diagnosing PTSD began in 1980 with the introduction of PTSD in the third edition of APA *DSM* (*DSM-III*). Formal recognition of PTSD led to a large body of systematic research on its features and research findings led to modification and refinement of the diagnostic criteria. But many of the diagnostic criteria in *DMS-III* are largely unchanged in the latest edition of the diagnostic manual, *DSM-IV*.

The evidence-based diagnosis of PTSD, according to *DSM-IV* (see Box 2.1) has several components: exposure to a traumatic event, intrusive re-experiencing of the event, avoidance and numbing, hyperarousal, at least a month of symptoms, and clinically significant distress or impairment that was not present before the trauma.

The World Health Organization disease classification system, the 10th edition of International Classification of Diseases (*ICD-10*), also includes diagnostic criteria for PTSD. The ICD diagnostic criteria for PTSD are similar to those in *DSM-IV* but do not include the *DSM-IV* criterion A2, that a response to a traumatic event involves intense fear, helplessness, or horror.

BOX 2.1

DSM-IV Diagnostic Criteria for Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:

(1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others

(2) the person's response involved intense fear, helplessness, or horror

B. The traumatic event is persistently re-experienced in one (or more) of the following ways:

(1) recurrent and intrusive distressing recollections of the event, including images, thoughts, and/or perceptions

(2) recurrent distressing dreams of the event

(3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience,
illusions, hallucinations, and/or dissociative flashback episodes, including those that occur on awakening or when intoxicated) (4) intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

(5) physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by at least three of the following:

(1) efforts to avoid thoughts, feelings, and/or conversations associated with the trauma

(2) efforts to avoid activities, places, and/or people that arouse recollections of the trauma

(3) inability to recall an important aspect of the trauma

(4) markedly diminished interest or participation in significant activities

(5) feeling of detachment or estrangement from others

(6) restricted range of affect (e.g., inability to have loving feelings)

(7) sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by at least two of the following:
(1) difficulty falling or staying asleep
(2) irritability or outbursts of anger
(3) difficulty concentrating
(4) hypervigilance
(5) exaggerated startle response

E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than one (1) month

F. The disturbance causes clinically significant distress and/or impairment in social, occupational, and/or other important areas of functioning

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CLINICAL DIAGNOSIS

After a traumatic event, there is substantial variation among patients with regard to both the timing of the onset of symptoms and the types of symptoms. Furthermore, there might be a delay between the onset of symptoms and when the patient seeks help. Patients also vary in how they present to a health professional. For example, a patient might present at a health facility with a physical or psychiatric complaint unrelated to PTSD, and it is only during the course of evaluating or treating the patient for the presenting complaint that symptoms of PTSD are identified and a diagnosis made. In other cases, a patient might present to a mental health professional who is conversant with the diagnosis of PTSD and is better able to elicit a narrative of exposure and symptoms, or a family member or other person familiar with the veteran might seek advice from a health professional about coping with a veteran who might be suffering from PTSD. The presenting symptoms and initial diagnostic process are variable and will necessitate a brief or long assessment, depending on the veteran's symptoms, mental and physical health, willingness and capacity to work with the health professional, and the presence of other physical or psychiatric disorders.

Optimally, a patient is evaluated in a confidential setting with a face-to-face interview by a health professional experienced in the

diagnosis of psychiatric disorders, such as a psychiatrist, psychologist, clinical social worker, or psychiatric nurse. The interview should elicit the patient's symptoms, assess the history of potentially traumatic events, and determine whether the patient meets the *DSM-IV* criteria for PTSD or whether the patient has a different psychiatric disorder, such as major depressive disorder or a possible neurologic disorder, such as traumatic brain injury. The health professional should also determine the frequency and severity of symptoms and the associated disability, determine whether there are comorbid psychiatric and medical conditions, and determine whether the patient might be malingering.

In some instances it might be difficult to elicit patient responses regarding each of the *DSM-IV* criteria, such as avoidance. Many patients do not recognize avoidance, especially once it has become a habit or a "rule." If a health professional merely asks if the patient avoids anything related to the trauma, the patient may respond negatively. However, if the patient is asked about specifics, such as going out alone at night, driving down deserted highways, or walking past piles of garbage, the patient might respond that they do not engage in those activities, thus providing more detailed information that might assist in the diagnosis. Thus, health professionals might need to ask patients about activities or symptoms in a variety of ways to help determine whether the patient meets the *DSM-IV* criteria for PTSD.

It is critical that adequate time be allocated for this assessment. Depending on the mental and physical health of the veteran, the veteran's willingness and capacity to work with the health professional, and the presence of comorbid disorders, the process of diagnosis and assessment will likely take at least an hour or could take many hours to complete.

Unfortunately, many health professionals do not have the time or experience to assess psychiatric disorders adequately or are reluctant to attribute symptoms to a psychiatric disorder. Furthermore, veterans with PTSD might not present to a mental health professional, because they do not attribute their symptoms to a psychiatric disorder, they feel that a stigma is associated with psychiatric illnesses, they have limited access to such professionals, or for other reasons, such as cost. Therefore, health professionals should be aware that veterans, especially those who have

served in war theaters, are at risk for the development of PTSD, but might present with physical or psychiatric complaints that are symptomatic of substance use disorder or other psychiatric conditions. Health professionals should ask all veterans about possible exposure to potentially traumatic events. Additionally, there is evidence that elderly veterans present with more somatic complaints of PTSD (Owens et al. 2005). It has been found that war-related psychiatric disorders are easily missed in the elderly male veteran, further emphasizing the need for direct questioning regarding military service (Macleod 1994).

It should be noted that a person might not meet full criteria for a diagnosis of PTSD and yet still be highly symptomatic and in need of treatment. PTSD symptoms might be mild to severe, and functioning might be influenced by other factors, such as comorbid conditions or social support. Severe symptoms might be disabling even in the absence of a full diagnosis.

A basic component in diagnosing PTSD is determining whether a person has experienced a traumatic event that has led to symptoms indicative of PTSD (see criterion A in Box 2.1). A war environment is rife with opportunities for exposure to traumatic events of many types (for example, see Table 2.1). Types of traumatic stressors related to war include serving in dangerous military roles, such as driving a truck at risk for encountering roadside bombs, patrolling the streets, and searching homes for enemy combatants, suicide attacks, sexual assaults or severe sexual harassment, physical assault, duties involving graves registration, accidents causing serious injuries or death, friendly fire, serving in medical units, killing or injuring someone, seeing someone being killed, injured, or tortured, and being taken hostage. From Vietnam to the present, several self-report questionnaires (discussed in Chapter 3) have been developed and administered to veterans to enhance the ability of well-trained and experienced professionals to assess the veterans' exposure to traumatic events.

TABLE 2.1 War Experiences Reported by Members of the US Army and Marine Combat Corps after Deployment to Iraq or Afghanistan[a]

Experience	Percentage Reporting Experience		
	Army Groups		Marine Group
	Afghanistan (N = 1,962)	Iraq (N = 894)	Iraq (N = 815)
Being attacked or ambushed	58	89	95
Receiving incoming artillery, rocket, or mortar fire	84	86	92
Being shot at or receiving small-arms fire	66	93	97
Shooting or directing fire at the enemy	27	77	87
Being responsible for the death of an enemy combatant	12	48	65
Being responsible for the death of a noncombatant	1	14	28
Seeing dead bodies or human remains	39	95	94
Handling or uncovering human remains	12	50	57
Seeing dead or seriously injured Americans	30	65	75
Knowing someone seriously injured or killed	43	86	87
Participating in demining operations	16	38	34

Experience	Percentage Reporting Experience		
	Army Groups		Marine Group
	Afghanistan (N = 1,962)	Iraq (N = 894)	Iraq (N = 815)
Seeing ill or injured women or children whom you were unable to help	46	69	83
Being wounded or injured	5	14	9
Clearing or searching homes or buildings	57	80	86
Engaging in hand-to-hand combat	3	22	9
Saved the life of a soldier or civilian	6	21	19

[a] Responses obtained in March 2003 after 6-month deployment to Afghanistan and in October-December 2003 after 6- to 8-month deployment to Iraq. Data exclude missing values because not all respondents answered every question. Combat experiences are worded as in survey.
SOURCE: Adapted with permission from Hoge et al. 2004.

ASSESSMENT

In addition to the formal diagnostic process, a more comprehensive assessment of a PTSD patient would include a determination of comorbidity, symptom severity, functional status, neuropsychologic impairments, and malingering.

Determination of comorbidity is an essential component of the optimal assessment of a patient with PTSD. Comorbidity refers to the presence of at least one disorder in addition to the presenting diagnosis (for example, PTSD and major depressive disorder in the same person, or PTSD and substance abuse in the same person). PTSD is marked by high rates of comorbidity; some studies indicate that more than 80% of people who have a diagnosis of PTSD also have major depressive or another psychiatric disorder (Black et al. 2004; Kessler et al. 1995). For example,

Kulka et al. (1990) found that 22% of Vietnam veterans with PTSD also had alcohol abuse or dependence. Hyer et al. (1993) found comorbidity rates of 68 to 82% for PTSD and lifetime prevalence of alcohol abuse. While a thorough clinical interview is likely to uncover existing comorbidities, some diagnostic instruments, such as the Structured Clinical Interview for DSM-IV, might also be used.

A comprehensive evaluation also will assess symptom severity (frequency and intensity), especially as related to following the course of the illness and the response to treatment. Symptom severity might be measured with a self-report questionnaire (for example, the PTSD Checklist); however, such questionnaires should not be used as a stand-alone measure but as an adjunct to a diagnostic interview. Chapter 3 provides a discussion of some of the instruments that are available to assess the severity of PTSD symptoms.

PTSD might impair a veteran's ability to work or to engage successfully in other socially defined roles, such as functioning as a parent or spouse or being able to support a family. Functional ability should be assessed independently of symptom severity in a comprehensive assessment. A diagnostic instrument, such as the Clinician-Administered PTSD Scale (see Chapter 3) can be used to query the patient about perceived impairment in his or her social and occupational functioning. The topic of functional ability is being considered by a separate Institute of Medicine committee, the Committee on Veterans' Compensation for Post Traumatic Stress Disorder, which has been established to conduct a study on compensation for PTSD.

Once a patient has been diagnosed with PTSD, testing might be useful in characterizing neurobehavioral and neurocognitive impairments. Although neuropsychologic testing might be used to validate the subjective reports of some patients, such tests might be diagnostically confusing, as impairments in attention, working memory, speed of information processing, delayed recall, and a number of other impairments might characterize not only PTSD, but also other psychiatric disorders, such as generalized anxiety disorder, major depressive disorder, most severe sleep disorders, chronic pain syndromes, postconcussive syndrome, and substance abuse. Some

studies show that the domains for which the most evidence of PTSD-related impairment exists are attention and memory (Vasterling et al. 2005), and executive functioning and global intellectual functioning (Wilson and Keane 2004). There are numerous neuropsychologic tests that might be used to determine the presence and level of those impairments (for example, the California Verbal Learning Test, Rey Auditory Verbal Learning Test, the continuous Visual Memory Test, the Verbal and Non Verbal Tests of the Wechsler Memory Scale, and the Recognition Memory Test). It should be noted, however, that those tests are seldom used in clinical settings but are employed primarily in research.

Some people who present with PTSD symptoms might be suspected of malingering, that is, suspected of faking PTSD or intentionally exaggerating their symptoms (APA 2000; Wilson and Keane 2004). The *DSM* acknowledges the potential for malingering in the presentation of PTSD and recommends that health professionals keep several factors in mind when assessing a patient, particularly in a medicolegal context; these include any significant discrepancies between a patient's reports of his or her symptoms and the clinical findings, a lack of cooperation on the patient's part in the diagnostic process or in following prescribed treatment, and the presence of antisocial personality disorder (APA 2000).

Malingering in connection with PTSD might be suggested by several psychometric instruments, such as MMPI-2 and the Impact of Event Scale-Revised. Resnick (1995) provides a checklist of eight indicators, the presence of two or more of which suggests malingering. Those indicators, some of which are similar to items described in the *DSM* are poor work record; prior incapacitating injuries; discrepant capacity for work and recreation; unvarying, repetitive dreams; antisocial personality traits; overidealized functioning before the trauma; evasiveness; and inconsistency in symptoms. Building on the indicators, Wilson and Keane (2004) suggest that clinicians also consider whether the patient demonstrates falsification of documentation, an overemphasis on "flashback" experiences relative to other PTSD symptoms, a tendency to focus blame for all problems on symptoms of PTSD, and psychometric testing that shows a pattern of malingering and does not

indicate probable PTSD. This topic will be considered by the Institute of Medicine Committee on Veterans' Compensation for Post Traumatic Stress Disorder.

BIOMARKERS OF POSTTRAUMATIC STRESS DISORDER

A biomarker is a measurable biologic change that occurs in association with a disease before, simultaneously with, or as a consequence of the disease. A biomarker is not a diagnostic marker. In the case of PTSD, it does not imply causation, because the necessary cause of PTSD is by definition a traumatic event. Biomarkers might represent pre-existing characteristics of people prone to PTSD, rather than effects of PTSD or even effects of the traumatic event. Many potential biomarkers are under study and they support a biologic basis of PTSD.

Examples of potential biomarkers being studied are increased concentrations of corticotrophin-releasing factor (e.g., Charney 2004; Yehuda 2002); measures of hyperarousal in response to stimuli and of delayed habituation to loud noises (e.g., Orr et al. 2003); measures of physiologic changes in noradrenergic brain systems and the hypothalamic-pituitary-adrenal axis (e.g., Southwick et al. 1994); alterations of brain structures, such as hyperactivation of the amygdala and hypoactivation of the prefrontal cortex (e.g., Pissiota et al. 2002; Shin et al. 2004; Vermetten and Bremner 2002); sleep disturbances (e.g., Breslau et al. 2004); and reduced volume of the hippocampus (e.g., Bremner et al. 1995; Gilbertson et al. 2002; Smith 2005). Currently, no biomarkers are useful in diagnosing PTSD, assessing the risk of developing it, or charting its progression.

New and future biomarker studies might help elucidate the way in which genetic, developmental, biologic, psychologic, experiential, and environmental factors interact to influence risk of, vulnerability to, and resistance to PTSD. Such studies will inform pathophysiologic models that might bring further breakthroughs in diagnosis and assessment.

CONCLUSION

As noted in this chapter, the core clinical features and diagnostic criteria of PTSD are well-established, and are efficacious in guiding the diagnosis and assessment of patients. The committee concluded that an optimal assessment of a patient consists of a face-to-face interview in a confidential setting with a health professional experienced in the diagnosis of psychiatric disorders. It is critical that adequate time be allocated for that assessment. Depending on the mental and physical health of the veteran, the veteran's willingness and capacity to work with the health professional, and the presence of comorbid disorders, the process of diagnosis and assessment will likely take at least an hour or could take many hours to complete.

REFERENCES

American Psychiatric Association. 2000. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association.

Black DW, Carney CP, Peloso PM, Woolson RF, Schwartz DA, Voelker MD, Barrett DH, Doebbeling BN. 2004. Gulf War veterans with anxiety: Prevalence, comorbidity, and risk factors. *Epidemiology* 15(2):135-142.

Bremner JD, Randall P, Scott TM, Bronen RA, Seibyl JP, Southwick SM, Delaney RC, McCarthy G, Charney DS, Innis RB. 1995. MRI-based measurement of hippocampal volume in patients with combat-related posttraumatic stress disorder. *American Journal of Psychiatry* 152(7):973-981.

Bremner JD, Southwick SM, Darnell A, Charney DS. 1996. Chronic PTSD in Vietnam combat veterans: Course of illness and substance abuse. *American Journal of Psychiatry* 153(3):369-375.

Breslau N, Lucia VC, Davis GC. 2004. Partial PTSD versus full PTSD: An empirical examination of associated impairment. *Psychological Medicine* 34(7):1205-1214.

Bryant RA, Harvey AG. 2002. Delayed-onset posttraumatic stress disorder: A prospective evaluation. *Australian and New Zealand Journal of Psychiatry* 36(2):205-209.

Carty J, O'Donnell ML, Creamer M. 2006. Delayed-onset PTSD: A prospective study of injury survivors. *Journal of Affective Disorders* 90(2-3):257-261.

Charney DS. 2004. Psychobiological mechanisms of resilience and vulnerability: Implications for successful adaptation to extreme stress. *American Journal of Psychiatry* 161(2):195-216.

Friedman MJ. 2003. *Post Traumatic Stress Disorder: The Latest Assessment and Treatment Strategies*. Kansas City, MO: Compact Clinicals.

Gilbertson MW, Shenton ME, Ciszewski A, Kasai K, Lasko NB, Orr SP, Pitman RK. 2002. Smaller hippocampal volume predicts pathologic vulnerability to psychological trauma. *Nature Neuroscience* 5(11):1242-1247.

Gray MJ, Bolton EE, Litz BT. 2004. A longitudinal analysis of PTSD symptom course: Delayed-onset PTSD in Somalia peacekeepers. *Journal of Consulting and Clinical Psychology* 72(5):909-913.

Green BL, Lindy JD, Grace MC, Gleser GC, Leonard AC, Korol M, Winget C. 1990. Buffalo Creek survivors in the second decade: Stability of stress symptoms. *American Journal of Orthopsychiatry* 60(1):43-54.

Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. 2004. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine* 351(1):13-22.

Hyer L, McCranie E, Peralme L. 1993. Dual diagnosis: PTSD and alcohol abuse. *NCP Clinical Newsletter* 3(3-4).

Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. 1995. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 52(12):1048-1060.

Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS. 1990. *Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.

Macleod AD. 1994. The reactivation of post-traumatic stress disorder in later life. *Australian and New Zealand Journal of Psychiatry* 28(4):625-634.

Op den Velde W, Hovens JE, Aarts PG, Frey-Wouters E, Falger PR, Van Duijn H, De Groen JH. 1996. Prevalence and course of posttraumatic stress disorder in Dutch veterans of the civilian resistance during World War II: An overview. *Psychological Reports* 78(2):519-529.

Orr SP, Metzger LJ, Lasko NB, Macklin ML, Hu FB, Shalev AY, Pitman RK, Harvard/Veterans Affairs Posttraumatic Stress Disorder Twin Study Investigators. 2003. Physiologic responses to sudden, loud tones in monozygotic twins discordant for combat exposure: Association with posttraumatic stress disorder. *Archives of General Psychiatry* 60(3):283-288.

Owens GP, Baker DG, Kasckow J, Ciesla JA, Mohamed S. 2005. Review of assessment and treatment of PTSD among elderly American armed forces veterans. *International Journal of Geriatric Psychiatry* 20(12):1118-1130.

Pissiota A, Frans O, Fernandez M, von Knorring L, Fischer H, Fredrikson M. 2002. Neurofunctional correlates of posttraumatic stress disorder: A PET symptom provocation study. *European Archives of Psychiatry & Clinical Neuroscience* 252(2):68-75.

Port CL, Engdahl B, Frazier P. 2001. A longitudinal and retrospective study of PTSD among older prisoners of war. *American Journal of Psychiatry* 158(9):1474-1479.

Resnick PJ. 1995. Guidelines for the evaluation of malingering in posttraumatic stress disorder. In: Simon RI, Editor. *Posttraumatic Stress Disorder in Litigation: Guidelines for Forensic Assessment*. Washington, DC: American Psychiatric Press. Pp. 117-134.

Ruzich MJ, Looi JCL, Robertson MD. 2005. Delayed onset of posttraumatic stress disorder among male combat veterans: A case series. *American Journal of Geriatric Psychiatry* 13(5):424-427.

Shin LM, Orr SP, Carson MA, Rauch SL, Macklin ML, Lasko NB, Peters PM, Metzger LJ, Dougherty DD, Cannistraro PA, Alpert NM, Fischman AJ, Pitman RK. 2004. Regional cerebral blood flow in the amygdala and medial prefrontal cortex during traumatic imagery in male and female Vietnam veterans with PTSD. *Archives of General Psychiatry* 61(2):168-176.

Smith ME. 2005. Bilateral hippocampal volume reduction in adults with post-traumatic stress disorder: A meta-analysis of structural MRI studies. *Hippocampus* 15(6):798-807.

Southwick SM, Bremner D, Krystal JH, Charney DS. 1994. Psychobiologic research in post-traumatic stress disorder. *Psychiatric Clinics of North America* 17(2):251-264.

Vasterling JJ, Brewin CR. 2005. *Neuropsychology of PTSD: Biological, Cognitive, and Clinical Perspectives*. New York: Guilford Press.

Vermetten E, Bremner JD. 2002. Circuits and systems in stress. II. Applications to neurobiology and treatment in posttraumatic stress disorder. *Depression and Anxiety* 16(1):14-38.

Wilson JP, Keane TM. 2004. *Assessing Psychological Trauma and PTSD (2nd Ed.).* New York: Guilford Press.

Yehuda R. 2002. Post-traumatic stress disorder. *New England Journal of Medicine* 346(2):108-114.

3

ASSESSMENT INSTRUMENTS

Although an optimal evaluation of a patient for PTSD consists of a face-to-face interview by a mental health professional trained in diagnosing psychiatric disorders, several instruments are available to facilitate the diagnosis and assessment of posttraumatic stress disorder (PTSD). These include screening tools, diagnostic instruments, and trauma and symptom severity scales. For example, there are brief screening tools, such as the 4-item Primary Care PTSD Screen, developed by the Department of Veterans Affairs National Center for Posttraumatic Stress Disorder; self-report screening instruments, such as the Posttraumatic Diagnostic Scale; and structured or semi-structured interviews, such as the Clinician-Administered PTSD Scale (CAPS), the Structured Clinical Interview for DSM-IV (SCID), the Diagnostic Interview Schedule for DSM-IV (DIS-IV), and the Composite International Diagnostic Interview (CIDI), all of which might be used prior to or as a complement to the clinical interview. These instruments are discussed below. Such measures are used most frequently in research settings, some might be used clinically to provide additional sources of documentation, and others might be given to veterans at a health facility prior to their first interview with health professional. Screening tools can be useful in initiating a conversation about exposure to traumatic events or possible PTSD symptoms. However, as noted in Briere (2004) “no psychological test can replace the focused attention, visible empathy, and extensive clinical experience of a well-trained and seasoned trauma clinician.”

DIAGNOSTIC INTERVIEWS

A health professional might use an unstructured interview to elicit information from a patient about symptoms related to each of the diagnostic criteria for PTSD. He or she might also use a structured or semi-structured diagnostic interview such as the CAPS, SCID, PTSD Symptom Scale–Interview Version (PSS-I), the Structured Interview for PTSD (SIP), the DIS-IV, or the CIDI. The use of those instruments can inform professional judgment in a clinical setting, but they are more commonly used in epidemiologic and treatment outcomes research.

The CAPS is a semi-structured interview, developed by the Department of Veterans Affairs National Center for Post-Traumatic Stress Disorder. The CAPS should be administered by a trained health professional and can be used to determine whether a patient meets the *DSM-IV* diagnostic criteria for PTSD. It has the advantage of assessing the array of PTSD symptoms, as well as their severity (frequency and intensity), but it cannot be used to determine the presence of comorbid psychiatric disorders. The CAPS contains 34 questions, 17 of which measure symptom frequency and 17 measure symptom intensity. The CAPS generally takes at least 40 to 60 minutes to administer (Foa and Tolin 2000).

The SCID is a widely used structured clinical interview for psychiatric disorders that contains a PTSD-specific module with 19 items. Like the CAPS, the SCID-PTSD module has questions related to each of the *DSM-IV* diagnostic criteria; patients' responses are listed as present, absent, or subthreshold. The SCID, like the CAPS, should be administered by a trained health professional. Unlike the CAPS, the SCID can be used to identify comorbid psychiatric disorders (Briere 2004); that is important because comorbid psychiatric disorders are common in PTSD patients. The SCID does not assess the severity of PTSD symptoms; the determination of whether a symptom passes a severity threshold is left to clinical judgment or further testing with a symptom-severity scale.

The PSS-I is a semi-structured interview that also assesses PTSD symptoms according to *DSM-IV* and their severity (Foa and Tolin 2000). It contains 17 questions that correspond to each of the *DSM* criteria and participants' responses are rated by a health professional from zero (not at all) to 3 (5 or more times per week/very much). It shows good agreement with the CAPS and the SCID in diagnosing PTSD. The PSS-I may be slightly better at detecting actual PTSD, whereas the CAPS is more accurate at ruling out false positives (Foa and Tolin 2000). This interview was developed for and has been tested on civilian populations with known trauma history, but has not been tested on combat veterans. The PSS-I has the advantage of taking only about 20 to 30 minutes to administer.

The SIP is a 19-item questionnaire that is also based on the *DSM-IV* criteria for PTSD (Davidson et al. 1989). Like the PSS-I, it identifies both PTSD symptoms and their severity and has two additional items on survivor and behavior guilt. The SIP has been tested on combat veterans with good correlation to other measures of PTSD but not to measures of combat exposure (Riggs and Keane 2006). The SIP can take 10 to 30 minutes to administer by a trained interviewer.

The DIS-IV is a structured interview for *DSM-IV* diagnoses designed to be administered by trained lay interviewers and is used in psychiatric research to assess psychiatric disorders (Friedman 2003). The CIDI is another structured diagnostic interview that can be used to assess many psychiatric disorders, but, as an international instrument, it is based on the *International Criteria for Disease* rather than the *DSM*. Like the DIS-IV, the CIDI can be administered by carefully trained lay interviewers for research purposes. The DIS-IV and the CIDI have both been used in major US population studies, such as the Epidemiologic Catchment Area program and the National Comorbidity Study, respectively (Helzer et al. 1987; Kessler et al. 1997). Both the DIS-IV and the CIDI can also be administered by clinicians. Those instruments aid in the diagnosis of PTSD and other disorders as well, but they do not assess symptom severity.

Structured interviews that were developed specifically for diagnosis of PTSD, such as the CAPS, will probably take longer to administer (an hour or more) but yield useful information, for example,

information regarding the intensity and frequency of symptoms, rather than simply whether the symptoms are present. Some of the diagnostic instruments, such as the PSS-I and SIP, can be used to determine not only whether a patient has PTSD symptoms but also symptom severity, comorbid psychiatric disorders, and whether a patient is malingering.

There are also several self-report instruments that can be used to help document symptoms and traumatic exposures. These include the Posttraumatic Diagnostic Scale (Foa et al. 1997), the Davidson Trauma Scale (Davidson et al. 1997), and the Detailed Assessment of Posttraumatic Stress (DAPS) (Briere 2004). Each of the instruments determines what symptoms of PTSD are present, as well as their frequency and intensity. The DAPS, which has 104 items, also assesses a broad range of psychologic functions and reactions. Although self-report instruments have utility for screening people with possible PTSD and in research settings, they should not substitute for a comprehensive diagnostic interview.

SELF-REPORTS OF TRAUMATIC EVENTS

Several self-report instruments have been developed to document a veteran's exposure to a war-zone traumatic event. Like the structured and semi-structured diagnostic interviews, they can be used in a clinical setting but have had more use as research tools. Table 3.1 lists some representative instruments that have been developed to assess exposure to traumatic events associated with military service. They might be used in conjunction with a diagnostic interview to document details of traumatic exposures. The instruments' function is to obtain greater detail about an exposure than the health professional might initially be able to elicit from the patient. The selection of an instrument depends on the reported war-zone trauma.

TABLE 3.1 Self-Report Measures of Exposure to Military-Related Potentially Traumatic Events

Scale Name	Number of Items	References
Abusive Violence Scale	5	Hendrix and Schumm 1990
Combat Exposure Index	7	Janes et al. 1991
Combat Exposure Scale	7	Keane et al. 1989
Deployment Risk and Resiliency Inventory	201	King et al. 2003
Graves Registration Duty Scale	24	Sutker et al. 1994
Military Stress Scale	6	Watson et al. 1988
Sexual Experiences Questionnaire—Department of Defense	22	Fitzgerald et al. 1999
Vietnam Era Stress Inventory—Specific Stressor Subscale	46	Wilson et al. 1980
War Events Scale	84	Unger et al. 1998
War Zone Stress Scale	72	King et al. 1995a
Women's Wartime Stressor Scale	27	Wolfe et al. 1993

SOURCE: Adapted with permission from Wilson et al. 2004.

NONDIAGNOSTIC ASSESSMENT AND SCREENING INSTRUMENTS

Several validated questionnaires are available to describe PTSD symptom severity in military personnel. Like the traumatic-event exposure instruments, they are self-report instruments that might be used as adjuncts to diagnostic interview instruments such as the CAPS or a comprehensive clinical diagnostic interview. Some of the instruments, such as the PTSD Checklist (PCL), the Posttraumatic Diagnostic Scale (Foa et al. 1997), and Davidson Trauma Scale (Davidson et al. 1997) discussed above, assess *DSM-IV* symptoms of PTSD as well as symptom severity; others, such as the Keane PTSD Scale of the Minnesota Multiphasic Personality Inventory (MMPI-PK), assess associated features of PTSD. With the PCL, patients use a 1-5 scale to rate the

frequency and intensity of their symptoms. The version developed for the military (PCL-M), which was validated on 123 male veterans, has a test-retest reliability of 96% (Blanchard et al. 1996; Weathers et al. 1991). The Mississippi Scale for Combat-Related PTSD has a test-retest reliability of 97% (Keane et al. 1988). The Impact of Event Scale−Revised (IES-R) is a widely used, 22-item, self-report instrument that measures a person's response to a traumatic stressor. The revised version more closely conforms with the *DSM-IV* criteria for PTSD. The severity of each symptom, during the past week, is rated by the respondent; the scale takes approximately 10 minutes to complete (Riggs and Keane 2006). The IES (not revised), the MMPI-PK, and the Mississippi Scale for Combat-related PTSD were used in the National Vietnam Veterans Readjustment Study. The Los Angeles Symptom Checklist (King et al. 1995b) has also been used to measure PTSD symptoms in Vietnam veterans; it has a test-retest reliability of 90% for all 43 items. Table 3.2 lists some of the symptom-severity instruments that have been used in research settings.

It must be emphasized that the instruments for assessing symptom severity do not diagnose PTSD and should not be used in lieu of a comprehensive clinical interview. Their utility is in eliciting details about symptoms that might not be provided by a patient during a clinical interview and they might provide an additional source of documentation.

In general, screening instruments are helpful for identifying people who might have a disease but are not very useful for assessing disorder progression, prognosis, or treatment efficacy. Screening instruments might be of value when a population is too large for each person to be assessed individually; a screening instrument might be used to help identify people who indicate that they have some PTSD symptoms and who would then receive a full diagnostic assessment by a health professional.

TABLE 3.2 Symptom-Severity Instruments for PTSD

Scale	Number of Items	References
PTSD Checklist	17	Blanchard et al. 1996
Mississippi Scale for Combat-Related PTSD	35	Keane et al. 1988; McFall et al. 1990
Impact of Event Scale−Revised	22	Horowitz et al. 1979
MMPI-PK	49	Keane et al. 1984
Self-Rating Inventory for PTSD	22	Hovens et al. 2002
Posttraumatic Diagnostic Scale	49	Foa et al. 1997
Davidson Trauma Scale	17	Davidson et al. 1997
War-Zone Related PTSD subscale of the Symptom Checklist 90−Revised	25	Derogatis and Cleary 1977
Los Angeles Symptom Checklist	43	King et al. 1995b

Recently, the VA National Center for Post-Traumatic Stress Disorder has developed a four-question screening tool, the Primary Care PTSD Screen (Prins et al. 2003), that can be used by primary-care physicians and other health professionals (the questions are available at: http://www.ncptsd.va.gov/facts/disasters/fs_screen_disaster.html). The Primary Care PTSD Screen has a sensitivity of 78% and a specificity of 87% (Friedman 2006). Patients answering yes to three or more of the questions should be considered for further evaluation for PTSD.

Other self-report screening instruments for PTSD have been developed and used with community trauma patients, however, none have been validated on combat veterans. Among these are: a short screening scale containing seven questions keyed to the *DSM-IV* criteria for PTSD (Breslau et al. 1999); the 17-item PTSD Symptom Scale Self-Report that was developed to identify PTSD in patients with substance use disorder (Coffey et al. 1998); the Screen for Posttraumatic Stress Symptoms that assesses PTSD in patients who do not report exposure to a traumatic event (Carlson 2001); and the Psychiatric Diagnostic

Screening Questionnaire, a 125-item questionnaire with a PTSD subscale (Zimmerman and Mattia 2001).

CONCLUSION

Several screening tools and diagnostic instrument are available to assist the clinician in making a PTSD diagnosis, documenting a traumatic event, and in assessing symptom severity. However, none of those instruments alone can provide a comprehensive diagnosis and assessment of a PTSD patient or replace a health professional trained in diagnosing psychiatric disorders. While assessment instruments are helpful, they are used primarily in research settings.

REFERENCES

Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. 1996. Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research and Therapy* 34(8):669-673.

Breslau N, Peterson EL, Kessler RC, Schultz LR. 1999. Short screening scale for DSM-IV posttraumatic stress disorder. *American Journal of Psychiatry* 156(6):908-911.

Briere J. 2004. *Psychological Assessment of Adult Posttraumatic States: Phenomenology, Diagnosis, and Measurement*. 2nd ed. Washington, DC: American Psychological Association.

Carlson EB. 2001. Psychometric study of a brief screen for PTSD: Assessing the impact of multiple traumatic events. *Assessment* 8(4):431-441.

Coffey SF, Dansky BS, Falsetti SA, Saladin ME, Brady KT. 1998. Screening for PTSD in a substance abuse sample: Psychometric properties of a modified version of the PTSD Symptom Scale Self-Report. Posttraumatic stress disorder. *Journal of Traumatic Stress* 11(2):393-329.

Davidson J, Smith R, Kudler H. 1989. Validity and reliability of the DSM-III criteria for posttraumatic stress disorder. Experience with a structured interview. *Journal of Nervous & Mental Disease* 177(6):336-341.

Davidson JR, Book S, Colket J, Tupler L, et al. 1997. Assessment of a new self-rating scale for post-traumatic stress disorder. *Psychological Medicine* 27(1):153-160.

Derogatis LR, Cleary PA. 1977. Factorial invariance across gender for the primary symptom dimensions of the SCL-90. *British Journal of Social and Clinical Psychology* 16(4):347-356.

Fitzgerald LF, Magley VJ, Drasgow F, Walso CR. 1999. Measuring sexual harassment in the military: The SEQ-DoD. *Military Psychology* 11(3):243-263.

Foa EB, Tolin DF. 2000. Comparison of the PTSD Symptom Scale-Interview Version and the Clinician-Administered PTSD scale. *Journal of Traumatic Stress* 13(2):181-191.

Foa EB, Cashman L, Jaycox L, Perry K. 1997. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment* 9(4):445-451.

Friedman MJ. 2003. *Post Traumatic Stress Disorder: The Latest Assessment and Treatment Strategies*. Kansas City, MO: Compact Clinicals.

Friedman MJ. 2006. Posttraumatic stress disorder among military returnees from Afghanistan and Iraq. *American Journal of Psychiatry* 163(4):586-593.

Helzer JE, Robins LN, McEvoy L. 1987. Post-traumatic stress disorder in the general population. Findings of the epidemiologic catchment area survey. *New England Journal of Medicine* 317(26):1630-1634.

Hendrix C, Schumm W. 1990. Reliability and validity of the Abusive Violence Scale. *Psychological Reports* 66(3 Pt 2):1251-1258.

Horowitz M, Wilner N, Alvarez W. 1979. Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine* 41(3):209-218.

Hovens JE, Bramsen I, van der Ploeg HM. 2002. Self-rating inventory for posttraumatic stress disorder: Review of the psychometric properties of a new brief Dutch screening instrument. *Perceptual & Motor Skills* 94(3 Pt 1):996-1008.

Janes GR, Goldberg J, Eisen SA, True WR. 1991. Reliability and validity of a combat exposure index for Vietnam era veterans. *Journal of Clinical Psychology* 47(1):80-86.

Keane TM, Malloy PF, Fairbank JA. 1984. Empirical development of an MMPI subscale for the assessment of combat-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology* 52(5):888-891.

Keane TM, Caddell JM, Taylor KL. 1988. Mississippi Scale for Combat-Related Posttraumatic Stress Disorder: Three studies in reliability and validity. *Journal of Consulting and Clinical Psychology* 56(1):85-90.

Keane TM, Fairbank JA, Caddell JM, Zimering RT, et al. 1989. Clinical evaluation of a measure to assess combat exposure. *Psychological Assessment* 1(1):53-55.

Kessler RC, Anthony JC, Blazer DG, Bromet E, Eaton WW, Kendler K, Swartz M, Wittchen HU, Zhao S. 1997. The US National Comorbidity Survey: overview and future directions. *Epidemiologia e Psichiatria Sociale* 6(1):4-16.

King DW, King LA, Gudanowski DM, Vreven DL. 1995a. Alternative representations of war zone stressors: relationships to posttraumatic stress disorder in male and female Vietnam veterans. *Journal of Abnormal Psychology* 104(1):184-195.

King DW, King LA, Vogt DS. 2003. *Manual for the Depoloyment Risk and Resilience Inventory (DRRI): A Collection of Measures for Studying Deployment Related Experiences in Military Veterans*. Boston, MA: National Center for PTSD.

King LA, King DW, Leskin G, Foy DW. 1995b. The Los Angeles Symptom Checklist: A self-report measure of posttraumatic stress disorder. *Assessment* 2:1-17.

McFall ME, Smith DE, Roszell DK, Tarver DJ, Malas KL. 1990. Convergent validity of measures of PTSD in Vietnam combat veterans. *American Journal of Psychiatry* 147(5):645-648.

Prins A, Ouimette P, Kimerling R, Cameron RP, Hugelshofer DS, Shaw-Hegwer J, Thrailkill A, Gusman FD, Sheikh JI. 2003. The primary care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry* 9(1):9-14.

Riggs D, Keane TM. 2006. Assessment strategies in the anxiety disorders. In: Rothbaum BO, Editor. *Pathological Anxiety: Emotional Processing in Etiology and Treatment of Anxiety*. New York: Guilford. Pp. 91-114.

Sutker PB, Uddo M, Brailey K, Vasterling JJ, Errera P. 1994. Psychopathology in war-zone deployed and nondeployed Operation Desert Storm troops assigned graves registration duties. *Journal of Abnormal Psychology* 103(2):383-390.

Unger WS, Gould RA, Babich M. 1998. The development of a scale to assess war-time atrocities: The War Events Scale. *Journal of Traumatic Stress* 11(2):375-383.

Watson CG, Kucala T, Manifold V, Vassar P, Juba M. 1988. Differences between posttraumatic stress disorder patients with delayed and undelayed onsets. *Journal of Nervous & Mental Disease* 176(9):568-572.

Weathers FW, Huska J, Keane TM. 1991. *The PTSD Checklist Military Version (PCL-M)*. Boston, MA: National Center for PTSD.

Wilson JP, Keane TM. 2004. *Assessing Psychological Trauma and PTSD*. 2nd Ed. New York: Guilford Press.

Wilson JP, Krause GE. 1980. *The Vietnam Era Stress Inventory*. Cleveland, OH: Cleveland State University.

Wolfe J, Brown PJ, Furey J, Levin KB. 1993. Development of a Wartime Stressor Scale for Women. *Psychological Assessment.* 5(3):330-335.

Zimmerman M, Mattia JI. 2001. The Psychiatric Diagnostic Screening Questionnaire: Development, reliability and validity. *Comprehensive Psychiatry* 42(3):175-189.

A

SPECIFIC QUESTIONS POSED BY THE DEPARTMENT OF VETERANS AFFAIRS TO THE INSTITUTE OF MEDICINE

The Department of Veterans Affairs (VA) posed a series of the specific questions to the Institute of Medicine. Below are the committee's responses to the questions that focused on diagnosis and assessment of posttraumatic stress disorder (PTSD). Questions related to treatment or compensation will be considered in later reports.

1. What are the accepted diagnostic criteria for PTSD?

The accepted diagnostic criteria for PTSD are given in the fourth edition of the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders, Text Revision* (*DSM-IV-TR,* hereafter referred to as the *DSM-IV*) (APA 2000). Chapter 2 (Box 2.1) lists those diagnostic criteria. In addition to *DSM-IV*, the World Health Organization disease classification system, *ICD-10* (the *International Classification of Diseases*, 10th edition), includes diagnostic criteria for PTSD. The *ICD* diagnostic criteria for PTSD are similar to those in *DSM-IV* but do not include the *DSM-IV* criterion A2 (that a response to a traumatic event involves intense fear, helplessness, or horror).

It should be noted that a person might not meet full criteria for the PTSD diagnosis and yet still be highly symptomatic and in need of treatment. PTSD symptoms might be mild to severe, and functioning might be influenced by other factors, such as comorbid conditions or social support. Severe symptoms might be disabling even in the absence of a full diagnosis.

DSM-IV diagnostic criteria for PTSD are used by VA's compensation and pension program, as required by the *Code of Federal Regulations* (38 CFR 4.130). *DSM-IV* is also accepted and relied on by private health-insurance companies, Medicare, Medicaid, and the Social Security Administration.

2. What would an evidence-based criteria set for diagnosis of PTSD include?

The diagnostic criteria for PTSD in *DSM-IV* (Box 2.1) are evidence-based and are the criteria most widely used by US health professionals. The criteria were developed by an expert task force assembled by APA in accordance with the process described in the introductory section of *DSM-IV*. The expert task force reviewed the evidence from the published scientific literature, reanalyzed data where necessary, and evaluated evidence from studies examining how the diagnostic criteria operate in real-world settings. A record of the evidence used by each task force is compiled in the several volumes of the *DSM-IV Sourcebook* (APA 2000).

3. What constitutes a stressor?

A stressor is any agent, condition, event, or other stimulus that results in a stress response. A stress response consists of behavioral and physiologic reactions that can cause changes in the functioning of an organism. A traumatic stressor, according to *DSM-IV*, involves two criteria: (1) the person experiences, witnesses, or is confronted with an event(s) that involves actual or threatened death or serious injury or threat to the physical integrity of oneself or others; and (2) the person's response involves intense fear, helplessness, or horror. Traumatic events during wartime, for example, might include serving in dangerous military roles, such as driving a truck at risk for encountering roadside bombs, patrolling the streets, and searching homes for enemy combatants, suicide attacks, sexual assaults or severe sexual harassment, physical assault, duties involving graves registration, accidents causing serious injuries or death, friendly fire, serving in medical units, killing or

injuring someone, seeing someone being killed, injured, or tortured, and being taken hostage.

4. How should stressful events be diagnosed and documented?

Health professionals with experience in diagnosing psychiatric disorders should rely on a confidential interview to elicit and document the patient's recollection of events, the impact on the patient, and to determine whether symptoms are present. Health professionals should ask relevant questions to determine whether the patient's report is consonant with the *DSM-IV* traumatic-stressor criteria (criterion A).

A number of instruments have been developed and are used, primarily in research settings, to document exposures to combat-related traumatic stressors. It is important to remember that each combat theater is different and therefore presents unique opportunities for traumatic exposures. Health professionals need to be familiar with the specific kinds of traumatic exposures that might be encountered in each theater.

In some clinical and research settings, it might be possible to obtain additional data concerning combat-related traumatic exposures, such as contemporaneous combat records and medical records of injuries. However, those records are not always reliable, complete, or available and might not accurately reflect a person's experience and psychological reactions.

5. How can and should a patient document a stressful event?

The primary role of the patient is to respond to the best of his or her ability to the questions of the health professional to elicit information about the stressful event(s). It should be noted that after exposure to trauma, the patient might have difficulty in recalling or describing what occurred. Some patients might be able to provide additional sources of documentation, such as eye-witness accounts, unit reports, medical records, occupational records, and medals or honors.

6. What are the components of an evidence-based diagnosis of PTSD?

An evidence-based diagnosis of PTSD comprises six components, according to *DSM-IV*: (1) exposure to a traumatic event, (2) intrusive re-experiencing of the traumatic event, (3) avoidance and numbing symptoms that were not present before the trauma, (4) symptoms of hyperarousal not present before the trauma, (5) at least a 1-month duration of symptoms, and (6) associated clinically significant distress or impairment.

7. What would diagnostic criteria be, based on best evidence, either based on or apart from official standards?

All diagnostic criteria should be based on best evidence. The official diagnostic criteria for PTSD as listed in *DSM-IV* were based on the best evidence that was available in 1994 when it was published. As indicated in the introduction to the *DSM-IV,* "Most diagnoses now have an empirical literature or available data sets that are relevant to decisions regarding the revision of the diagnostic manual. The Task Force on *DSM–IV* and its Work Groups conducted a 3-stage empirical process that included: (1) comprehensive and systematic reviews of the public literature, (2) reanalyses of already-collected data sets, and (3) extensive issue-focused field trials" (APA 2000).

As new evidence becomes available, *DSM* will be revised as necessary to reflect that evidence as reviewed by its expert panel. A new task force on PTSD will be formed in preparation for the next edition of *DSM*, which is to be published in 2011.

8. What constitutes optimal evaluation of a patient for PTSD?

Optimally, a patient should be evaluated in a confidential setting in a face-to-face interview by a health professional experienced in diagnosing psychiatric disorders (for example, psychiatrists, psychologists, clinical social workers, and psychiatric nurses). The interview should elicit the patient's symptoms, assess the history of potentially traumatic events, determine whether the patient meets the

DSM-IV criteria for PTSD (see Chapter 2, Box 2.1), determine the frequency and severity of symptoms and any associated disability, and assess the presence of comorbid psychiatric and medical conditions. Adequate time should be devoted to this assessment. Depending on the mental and physical health status of the veteran and on the experience and background of the health professional conducting the assessment, the diagnosis and assessment process will likely take at least an hour or could take many hours to complete.

A major problem in optimizing evaluation for PTSD is that many health professionals do not have the time or experience to assess psychiatric disorders adequately or might be reluctant to attribute a veteran's symptoms to a psychiatric disorder. Furthermore, veterans with PTSD might not present to a mental-health professional, because they might not attribute their symptoms to a psychiatric disorder, they might feel that there is a stigma associated with psychiatric illnesses, they might have little or inadequate access to such professionals, or there might be other considerations, such as cost.

Health professionals should be aware that veterans, especially those who have served in war theaters, are at risk for the development of PTSD, but might present with physical or psychiatric complaints that are symptomatic of substance use disorder or other psychiatric conditions. Health professionals should ask all veterans about possible exposure to potentially traumatic events. Brief screening instruments for PTSD have been developed for use in primary-care settings and should be considered to identify patients who might benefit from further evaluation.

9. What neuropsychological evaluation or other testing should be included in an optimal evaluation of a patient for PTSD?

Neuropsychological testing is not part of a PTSD diagnostic evaluation. However, during the evaluation of a patient for PTSD, a health professional might identify problems, such as memory loss, attention deficits, or confusion, which might suggest the appropriateness of neuropsychologic testing.

10. What are useful biomarkers?

No biomarkers are clinically useful or specific in diagnosing PTSD, assessing the risk of developing it, or charting its progression. Many biomarkers, however, are under study and they support a biologic basis of PTSD. Potential biomarkers currently under study include increased concentrations of corticotropin-releasing factor in the cerebrospinal fluid; low cortisol concentrations in the blood; measures of hyperarousal; delayed habituation to loud noises; panic attacks and flashbacks when noradrenergic systems are activated; alterations of brain structures, such as hyperactivation of the amygdala and hypoactivation of the prefrontal cortex when the person remembers trauma; and sleep disturbances, including nightmares of traumatic events. Reduced volume of the hippocampus might also be correlated with the development of PTSD. Preliminary evidence suggests that genetic factors might play a predisposing or modulating role in the development of PTSD.

REFERENCE

American Psychiatric Association. 2000. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association.

B

ESTABLISHING POSTTRAUMATIC STRESS DISORDER AS A PSYCHIATRIC DISORDER

As with many other disorders introduced decades ago, posttraumatic stress disorder (PTSD) was first added to psychiatry's diagnostic manual without what is considered by today's standards to be rigorous evidence from systematic research. Its introduction was based on clinicians' informal experience with groups of Vietnam veterans and Holocaust victims rather than on formal studies (Brewin 2003; Shepherd 2001). Nevertheless, many of the symptoms originally listed in the first diagnostic criteria for PTSD introduced in the third edition (1980) of the American Psychiatric Association (APA) *Diagnostic and Statistical Manual of Mental Disorders*, *DSM-III*, have remained largely unchanged in the current (fourth) edition of the manual, *DSM-IV*.

Today, health professionals in the United States diagnose psychiatric disorders according to criteria listed in *DSM-IV* (APA 2000). *DSM* is the most authoritative source used by clinicians, mental health professionals, government agencies, and health insurers. Its diagnoses have myriad applications in health statistics, reimbursement, disability claims, and recordkeeping. The decision to revise diagnostic criteria or to add a new disorder to *DSM* is made by a consensus of experts organized under the auspices of the APA. The process relies on evaluation of the best available evidence from clinical practice and research.

A decade before the *DSM-III*, a landmark paper proposed five criteria to establish the validity of a psychiatric diagnosis on the basis of methods used in other fields of medicine for validation of medical diagnoses (Robins and Guze 1970). The criteria, which Robins and Guze's influential paper called phases, were on the leading edge of the effort to classify psychiatric illness on the basis of systematic studies. The concept constituted a departure from the traditional dependence of psychiatric diagnosis on psychoanalytic theory. Robins and Guze wanted

the field of psychiatry to split with its nonscientific past and, through more systematic data-based studies, achieve an equal footing with the rest of medicine (Luhrmann 2000). "We believe that a valid classification is an essential step in science . . . One of the reasons that diagnostic classification has fallen into disrepute among some psychiatrists is that diagnostic schemes have been largely based on a priori principles rather than upon systematic studies" (Robins and Guze 1970). The a priori principles alluded to were psychoanalytic theories about causation of psychiatric illness. The work of Robins and Guze was elaborated on by Kendler (1980), Kendell (1989), and Kendell and Jablensky (2003), who distinguished between antecedent validators (precipitating factors), concurrent validators (psychologic tests), and predictive validators (diagnostic consistency over time).

Applying the five phases of Robins and Guze, this section examines the evidence that PTSD is a valid disorder (as defined below). It is not an exhaustive review but illustrates the complex nature of diagnostic validation, a process that often takes years or decades. The process is always receptive to new empirical evidence in shaping the outcome, the diagnostic criteria themselves. The five phases set a high bar for any diagnosis in medicine, and few existing diagnoses, whether in psychiatry or in other fields, would meet all of them. Therefore, fulfilling all the phases should not be seen as an absolute requirement for inclusion of a disorder in a classification scheme, such as *DSM*.

At the outset, it is important to emphasize that validating PTSD as a disorder is not the same as making a PTSD diagnosis. Making a diagnosis is guided by knowledge of diagnostic criteria, to be sure, but it also requires clinical judgment in application of criteria: "the specific diagnostic criteria included in *DSM-IV* are meant to serve as guidelines to be informed by clinical judgment and are not meant to be used in a cookbook fashion" (APA 2000).

The five phases for establishing the validity of a disorder (Robins and Guze 1970) are as follows:

- Describe the core clinical features of the disorder.
- Differentiate the disorder from other disorders.
- Conduct laboratory studies.

- Determine the temporal stability of the disorder.
- Determine whether the disorder aggregates in families.

This appendix is organized according to each of the five phases. Wherever possible, we draw on studies of veterans or other groups with comparable traumatic exposures.

CORE CLINICAL FEATURES

Defining a disorder begins by describing individual cases and then proceeds to the gathering of more data. In the 1970s, clinicians treating Vietnam veterans described two core symptom clusters: re-experiencing a trauma through flashbacks and other symptoms, and reacting to the reminders of the trauma with avoidance (avoiding thoughts, feelings, or conversations about the traumatic event or situations that remind one of it) and emotional numbness (diminished responsiveness to the external world, feeling of detachment from other people, or having a marked inability to feel emotions, such as intimacy and tenderness). A third core symptom cluster, hyperarousal, was added in 1987 with publication of a revision of *DSM-III*, *DSM-III-R*, because high levels of arousal had been associated with PTSD in studies during the intervening years (Brewin 2003).

Several additional lines of evidence help to characterize PTSD's core clinical features in the first phase of validating the disorder. The first draws from statistical studies that use factor analysis to explore whether PTSD symptom clusters cohere. The questions for research are, Do the symptom clusters (re-experiencing, numbing and avoidance, and hyperarousal) cohere (occur together)? Do they correspond to underlying biologic or psychologic processes? Asmundson et al. (2004) examined the results of numerous factor analysis studies and concluded that many of them support PTSD as having four core symptom clusters instead of three: re-experiencing and hyperarousal were indeed separate symptom clusters, but avoidance and numbing actually represented two separate ones instead of a single cluster, as defined in *DSM-IV*.

The second line of evidence draws from epidemiologic research suggesting that PTSD's core clinical features have been found to be consistent among the diverse populations in which it has been studied.

After the Gulf War, veterans from three developed countries, the United States (Iowa), Australia, and Canada, displayed a similar prevalence of PTSD (Black et al. 2004; Goss Gilroy Inc. 1998; Ikin et al. 2004; McKenzie et al. 2004). The consistency of PTSD in diverse populations is also supported by studies that compared PTSD prevalence in developed and undeveloped countries. People in undeveloped countries and non-Western cultures might be expected, a priori, to have different ways of manifesting distress from trauma exposure (Department of Health and Human Services 2001), but PTSD has been documented worldwide in postconflict settings, including Algeria and Palestinian territories (de Jong et al. 2003), whether after war or after mass violence. In one study, cross-national similarities were found among civilians in the United States and Kenya after the same type of traumatic event, a terrorist bombing (North et al. 2005). That study evaluated people who several months earlier had been directly exposed to a terrorist bombing and also measured PTSD with uniformity of assessment (a fully structured psychiatric interview, the Diagnostic Interview Schedule, with adjustments for cultural differences in expression). The study found similar bombing-related PTSD prevalence among survivors in the two countries and similar prevalence in the two sexes: some 30% of men and 50% of the women from both the United States and Kenya had PTSD related to the terrorist bombing. Those studies of veterans from different countries and numerous other populations and traumatic events support the concept of PTSD as a distinct disorder.

DIFFERENTIATING POSTTRAUMATIC STRESS DISORDER FROM OTHER DISORDERS

A valid disorder is one that is distinct from others with similar symptoms, rather than merely another manifestation of them. The differentiation phase is difficult to apply to PTSD because it shares many symptoms with other psychiatric disorders, notably other types of anxiety disorders and major depressive disorder. Another difficulty is that a patient who has PTSD is likely also to have at least one other psychiatric disorder (a phenomenon known as comorbidity). Comorbidity, by itself,

does not preclude the validation of PTSD as a distinct disorder, but it makes the process of demonstrating its distinctiveness more difficult.

A study (Keane et al. 1997) sought to determine systematically whether PTSD is distinguishable from major depressive disorder (MDD) and generalized anxiety disorder (GAD). Psychologists and psychiatrists highly experienced in diagnosing PTSD were asked to distinguish among the three disorders by carefully rating their distinguishing clinical features. The investigators gave more than 300 Department of Veterans Affairs clinicians a list of 80 descriptors for all three disorders (using symptoms from *DSM-III-R* and associated features), and 10 distracters (features not directly related to any of the three). Sixteen of the 80 descriptors overlapped with two disorders and in some cases overlapped with all three. The clinicians were asked to rate the extent to which each item on the list characterized each of the three disorders. The study found that experienced clinicians could readily identify features distinguishing PTSD from the other two disorders, although this was not tested in patients.

In particular, these distinguishing characteristics of PTSD were identified: symptoms linked to a specific trauma, symptoms of avoiding anything reminiscent of the trauma, and fears of acting out anger and frustration in response to lingering effects of the trauma. Features that the clinicians identified as distinguishing PTSD from MDD in particular were involvement with current activities not reminiscent of the trauma. MDD was related to inactivity. GAD was accompanied by widespread physiologic reactivity, whereas physiologic reactivity in PTSD was more closely associated with memories of traumas. The study also identified the 34 descriptors most strongly identified with each of the three disorders. Finally, using factor analysis, the study uncovered the minimal number of hypothetical factors that the clinicians used to identify the three disorders. The study did not demonstrate that health professionals can distinguish PTSD, GAD, and MDD from each other in patients, but it did show that features of PTSD are conceptually distinct from the other disorders.

DSM-IV spells out the particular diagnoses that must be considered when a patient is being evaluated for PTSD. Differential diagnoses include panic disorder, GAD, phobias, MDD, bipolar II disorder, somatization disorder, substance-use disorders, adjustment

disorders, psychotic disorders, obsessive-compulsive disorder, and malingering.

CONDUCTING LABORATORY STUDIES OF POSTTRAUMATIC STRESS DISORDER

The broad term laboratory studies refers to a variety of physiologic tests, imaging techniques, pathology studies, and other means of medical examination that can support the investigation of PTSD as a valid disorder. Laboratory studies are of two general types: reproducible psychologic tests and studies of biologic markers (Robins and Guze 1970). A psychologic test, in this context, measures objectively observed behaviors (patterns of responses to test questions) associated with a disorder. The Minnesota Multiphasic Personality Inventory, for example, can help to distinguish between expression of genuine illness and symptom exaggeration.

A biologic marker (biomarker) is a measurable biologic change that occurs before, during, or as a consequence of a disease process. Many biomarkers are under study, and they support a biologic basis of PTSD (see Chapter). The last 2 decades have witnessed progress in developing laboratory tests to validate PTSD as a disorder but none has been shown to be specific enough to distinguish people who have PTSD from those who do not. In other words, no laboratory test is currently useful for diagnosing PTSD.

DEMONSTRATING TEMPORAL STABILITY OF POSTTRAUMATIC STRESS DISORDER

Temporal stability is related to whether a disorder retains its distinct profile or evolves into another, established disorder. During the first days and weeks after a traumatic event, an immediate stress response might occur in a large proportion of those exposed. The immediate phase can last for several days or weeks. Thereafter, effects start to decline in most people, depending on the traumatic event and its

intensity. For that reason, *DSM-IV* does not permit the diagnosis of PTSD before the passage of at least a month after the traumatic event.

To establish temporal stability, the same disorder must be present in the same person at a second time in a longitudinal assessment. For example, all the people in the index sample with a diagnosis might no longer report symptoms of that diagnosis at followup, but they might be replaced by an equal number of new cases in people who did not have the disorder at the index time. That is, the overall percentages with PTSD at index and followup could be the same, but the stability of the cases would be zero. Therefore, individual cases, rather than overall rates, should be examined because of individual fluctuations.

Temporal stability also requires that the condition not evolve into a different psychiatric disorder. It is important to evaluate a person for all the other disorders that are part of a differential diagnosis of PTSD, such as GAD and MDD, both at the index time and at followup. Meeting those two criteria requires that studies be longitudinal and use a broad-based assessment method that evaluates participants for PTSD and for other psychiatric disorders. However, the committee was unable to locate such studies for PTSD.

DETERMINING WHETHER POSTTRAUMATIC STRESS DISORDER AGGREGATES IN FAMILIES

The fifth phase in validating a disorder is to determine whether it aggregates in families (Robins and Guze 1970). A key question is how a family history contributes to PTSD. Is it through genetic vulnerability, shared family environment, or both? Research in the 1980s suggested that PTSD occurred in families with other anxiety disorders and depression. It found that family members of veterans with PTSD had higher rates of GAD, alcoholism, and (to a lesser extent) MDD and other types of depressive illness (Davidson et al. 1989; Davidson et al. 1985). A family history of psychiatric illness might increase vulnerability to developing PTSD, but according to the conclusions of two recent meta-analyses, it plays a relatively small role (Brewin et al. 2000; Ozer et al. 2003).

Twin studies help to sort out the relative contributions of shared genes versus shared environment. In one study of more than 4,000 twins during the Vietnam era (True et al. 1993), the investigators analyzed data from members of male twin pairs both of whom served in Southeast Asia versus twin pairs neither of whom served there. Monozygotic twins had a higher concordance than dizygotic twins for combat exposure. That indicates that exposure was not random and complicates the analysis of the role of genes versus shared environment in predisposition to PTSD. The investigators first had to make a statistical adjustment to remove the effect of monozygotic twins' having higher concordance for combat exposure. Even after the adjustment, they found that genetic factors accounted for around one-third of PTSD symptoms. They interpreted their findings as indicating that genes played a dual role: as risk factors for onset of PTSD and as risk factors for exposure to combat (which, in turn, enhances the risk of PTSD). That finding is supported by several other studies (Breslau et al. 1991; Lyons et al. 1993). The shared environment in which twins grew up played a very small role, predicting only one symptom: painful memories. A separate analysis of the same twins dataset found that the severity of combat exposure itself was far more important than genetics in the long-term persistence of PTSD symptoms (Goldberg et al. 1990; Roy-Byrne et al. 2004).

A separate avenue of research implicating genes involves the study of the hippocampus, a brain structure associated with attention and memory. Reduced hippocampal volume has been found to be associated with PTSD (Bremner et al. 1995).

Also, in light of the evidence suggesting genetic involvement in PTSD, recent studies have begun to identify specific genes. The two potential genes noted here are related to neurotransmission in the brain. One potential candidate is the serotonin transporter promoter gene (Lee et al. 2005). It was chosen for study because alterations in serotonin concentrations are associated with symptoms commonly seen in PTSD, including hypervigilance, exaggerated startle, irritability, impulsivity, aggression, and intrusive memories (Southwick et al. 1999). Another potential candidate is the D2 dopamine receptor gene, which might be linked to a favorable treatment response to the drug paroxetine. Investigators considered that the gene might be useful in predicting

which PTSD patients would improve in social functioning if treated with paroxetine (Lawford et al. 2003).

CONCLUSION

This appendix has examined the evidence for establishing PTSD as a valid disorder by using the five criteria proposed by Robins and Guze (1970): describing the core clinical features; differentiating from other disorders, conducting laboratory studies, determining temporal stability, and determining aggregation in families. The evidence is robust for the core clinical features of PTSD, which appear to be consistent among diverse populations. Progress has been made in fulfilling the remaining criteria.

REFERENCES

American Psychiatric Association. 2000. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association.

Asmundson GJ, Stapleton JA, Taylor S. 2004. Are avoidance and numbing distinct PTSD symptom clusters? *Journal of Traumatic Stress* 17(6):467-475.

Black DW, Carney CP, Peloso PM, Woolson RF, Schwartz DA, Voelker MD, Barrett DH, Doebbeling BN. 2004. Gulf War veterans with anxiety: Prevalence, comorbidity, and risk factors. *Epidemiology* 15(2):135-142.

Bremner JD, Randall P, Scott TM, Bronen RA, Seibyl JP, Southwick SM, Delaney RC, McCarthy G, Charney DS, Innis RB. 1995. MRI-based measurement of hippocampal volume in patients with combat-related posttraumatic stress disorder. *American Journal of Psychiatry* 152(7):973-981.

Breslau N, Davis GC, Andreski P, Peterson E. 1991. Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry* 48(3):216-222.

Brewin CR. 2003. *Posttraumatic Stress Disorder: Malady or Myth?* New Haven, CT: Yale University Press.

Brewin CR, Andrews B, Valentine JD. 2000. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology* 68(5):748-766.

Davidson J, Swartz M, Storck M, Krishnan RR, Hammett E. 1985. A diagnostic and family study of posttraumatic stress disorder. *American Journal of Psychiatry* 142(1):90-93.

Davidson J, Smith R, Kudler H. 1989. Familial psychiatric illness in chronic posttraumatic stress disorder. *Comprehensive Psychiatry* 30(4):339-345.

de Jong JT, Komproe IH, Van Ommeren M. 2003. Common mental disorders in postconflict settings. *Lancet* 361(9375):2128-2130.

Department of Health and Human Services. 2001. *Mental Health: Culture, Race, and Ethnicity*. A Report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

Goldberg J, True WR, Eisen SA, Henderson WG. 1990. A twin study of the effects of the Vietnam War on posttraumatic stress disorder. *Journal of the American Medical Association* 263(9):1227-1232.

Goss Gilroy Inc. 1998. *Health Study of Canadian Forces Personnel Involved in the 1991 Conflict in the Persian Gulf*. Ottawa, Canada: Goss Gilroy Inc. Department of National Defence.

Ikin JF, Sim MR, Creamer MC, Forbes AB, McKenzie DP, Kelsall HL, Glass DC, McFarlane AC, Abramson MJ, Ittak P, Dwyer T, Blizzard L, Delaney KR, Horsley KWA, Harrex WK, Schwarz H. 2004. War-related psychological stressors and risk of psychological disorders in Australian veterans of the 1991 Gulf War. *British Journal of Psychiatry* 185(Aug.):116-126.

Keane TM, Taylor KL, Penk WE. 1997. Differentiating post-traumatic stress disorder (PTSD) from major depression (MDD) and generalized anxiety disorder (GAD). *Journal of Anxiety Disorders* 11(3):317-328.

Kendell R, Jablensky A. 2003. Distinguishing between the validity and utility of psychiatric diagnoses. *American Journal of Psychiatry* 160(1):4-12.

Kendell RE. 1989. Clinical validity. *Psychological Medicine* 19(1):45-55.

Kendler KS. 1980. The nosologic validity of paranoia (simple delusional disorder): A review. *Archives of General Psychiatry* 37(6):699-706.

Lawford BR, Young RM, Noble EP, Kann B, Arnold L, Rowell J, Ritchie TL. 2003. D2 dopamine receptor gene polymorphism: Paroxetine and social functioning in posttraumatic stress disorder. *European Neuropsychopharmacology* 13(5):313-320.

Lee HA, Gabriel R, Bale AJ. 2005. Clinical outcomes of Gulf veterans' medical assessment programme referrals to specialized centers for Gulf veterans with post-traumatic stress disorder. *Military Medicine* 170(5): 400-405.

Luhrmann TM. 2000. *Of Two Minds: The Growing Disorder in American Psychiatry*. New York: Knopf.

Lyons MJ, Goldberg J, Eisen SA, True W, Tsuang MT, Meyer JM, Henderson WG. 1993. Do genes influence exposure to trauma? A twin study of combat. *American Journal of Medical Genetics* 48(1):22-27.

McKenzie DP, Ikin JF, McFarlane AC, Creamer M, Forbes AB, Kelsall HL, Glass DC, Ittak P, Sim MR. 2004. Psychological health of Australian veterans of the 1991 Gulf War: An assessment using the SF-12, GHQ-12 and PCL-S. *Psychological Medicine* 34(8):1419-1430.

North CS, Pfefferbaum B, Narayanan P, Thielman S, McCoy G, Dumont C, Kawasaki A, Ryosho N, Kim YS, Spitznagel EL. 2005. Comparison of post-disaster psychiatric disorders after terrorist bombings in Nairobi and Oklahoma City. *British Journal of Psychiatry* 186 (June):487-493.

Ozer EJ, Best SR, Lipsey TL, Weiss DS. 2003. Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin* 129(1):52-73.

Robins E, Guze SB. 1970. Establishment of diagnostic validity in psychiatric illness: Its application to schizophrenia. *American Journal of Psychiatry* 126(7):983-987.

Roy-Byrne P, Arguelles L, Vitek ME, Goldberg J, Keane TM, True WR, Pitman RK. 2004. Persistence and change of PTSD symptomatology—a longitudinal co-twin control analysis of the Vietnam Era Twin Registry. *Social Psychiatry and Psychiatric Epidemiology* 39(9):681-685.

Shepherd B. 2001. *A War of Nerves: Soldiers and Psychiatrists in the Twentieth Century*. Cambridge, MA: Harvard University Press.

Southwick SM, Paige S, Morgan CA 3rd, Bremner JD, Krystal JH, Charney DS. 1999. Neurotransmitter alterations in PTSD: Catecholamines and serotonin. *Seminars in Clinical Neuropsychiatry* 4(4):242-248.

True WR, Rice J, Eisen SA, Heath AC, Goldberg J, Lyons MJ, Nowak J. 1993. A twin study of genetic and environmental contributions to liability for posttraumatic stress symptoms. *Archives of General Psychiatry* 50(4):257-264.

C

RISK AND PROTECTIVE FACTORS

Some people who are exposed to a traumatic event will develop posttraumatic stress disorder (PTSD) while others will not. Its occurrence depends on a complex interplay between risk factors that increase the likelihood of onset and protective factors that diminish it. Other variables influence the development of PTSD, including factors that preceded the exposure to trauma, factors associated with the trauma exposure itself, and factors associated with the recovery environment.

This appendix presents an abbreviated discussion of a few of the numerous risk factors and protective factors that might influence the development of PTSD among military personnel. The topic will be considered by the committee in greater detail in a report on deployment-related stress due to be published in 2007.

RISK FACTORS

For a military population, one of the most important risk factors for the onset of PTSD is exposure to combat. Features of combat, such as its intensity, whether an injury was sustained, or whether torture or captivity occurred, are related to the severity of exposures that by definition qualify within the *Diagnostic and Statistical Manual* (*DSM-IV*) criteria as traumatic. Other risk factors that might be involved with the development of PTSD are, for example, military sexual assault, homecoming environment, sex, and ethnicity (see Table C.1).

TABLE C.1 Risk Factors for PTSD in Military Populations

Risk Factor	References
Combat Exposure	
Combat and its severity	Black et al. 2004; Goldberg et al. 1990; Hoge et al. 2004; Kang et al. 2003; Kulka et al. 1990; O'Toole et al. 1998; Roy-Byrne et al. 2004; Wolfe et al. 1999
Being wounded or injured	Koren et al. 2005; North et al. 1999; Schreiber and Galai-Gat 1993;
Witnessing death	Breslau et al. 1999; Ford 1999
Witnessing grotesque death	Green et al. 1990
Serving on graves-registration duty	Sutker et al. 1994
Being tortured or being taken captive	de Jong et al. 2001; Mollica et al. 1998; Speed et al. 1989; Sutker et al. 1993
Unpredictable and uncontrollable stressful exposure	Foa et al. 1992; Southwick et al. 1993
Military Environment	
Sexual trauma, including assault	Fontana et al. 1997b; Kang et al. 2005
Combat preparedness	Asmundson et al. 2002
Deployment to war zone without combat	Ikin et al. 2004
Homecoming Environment	
Lack of social support	Fontana and Rosenheck 1994; Fontana et al. 1997a; Green et al. 1990; Johnson et al. 1997; Koenen et al. 2003; Stretch 1985; Stretch et al. 1985
Personal Factors	
Cumulative life stress before or after the traumatic event	Breslau et al. 1999; Brewin et al. 2000; King et al. 1998; Maes et al. 2001; North et al. 1999
More resource loss, lower income or education, older age	Norris et al. 2002
Being female	Kang et al. 2003; Wolfe et al. 1999

Table C.1 calls attention to a variety of risk factors for PTSD identified in studies of military populations. Most of the studies cited were conducted in Vietnam or Gulf War veteran populations. A few of the risk factors noted above are discussed below because they are important or frequent predictors of PTSD in veterans.

Combat Exposure

Combat exposure and its severity are well-established risk factors documented in carefully designed studies of Vietnam and Gulf War veterans (e.g., Goldberg et al. 1990; Kang et al. 2003; Kulka et al. 1990; O'Toole et al. 1996). Combat exposure, in this context, includes many specific types of related exposures, such as prisoner-of-war status and witnessing gruesome injuries, torture, and death. Generally speaking, the greater the degree of combat exposure, the greater the likelihood of developing PTSD and the longer the duration of symptoms (Hoge et al. 2004; Kang et al. 2003; Koenen et al. 2003; Wolfe et al. 1999; Wolfe et al. 1999). A nationally representative study of 30,000 veterans of the Gulf War era found that the likelihood of PTSD increased as the number of combat-related stressors increased (Kang et al. 2003). Likewise, combat troops returning from Iraq report increased rates of PTSD compared to troops before deployment and compared to rates after deployment to Afghanistan (Hoge et al. 2004; Koenen et al. 2003; Roy-Byrne et al. 2004).

For many soldiers and other military personnel, deployment to a war zone is the most traumatic event in their lives. Relative to other common types of trauma, men who name combat trauma as the most traumatic event of their lives are at the highest risk for PTSD, according to a nationally representative study. They were 7 times more likely to have PTSD than those who named other events as their "worst lifetime traumatic event" (Prigerson et al. 2001). Nearly 42% of men who regarded combat as their worst lifetime experience met criteria for PTSD at some point in their lives. That rate was higher than that for any of the other common types of trauma reported by men in the study, including being sexually molested or raped and being physically abused or neglected as a child (Table C.2). Combat-related PTSD also was more likely to be associated with serious occupational and marital problems. In

a separate analysis in the same epidemiologic study, combat-related PTSD was found responsible for nearly 30% of all PTSD diagnoses in the United States (Prigerson et al. 2002)

TABLE C.2 Rates of PTSD, Occupational Problems, and Marital Problems in Traumatized Men in National Comorbidity Survey

	Lifetime PTSD		**Occupational and Marital Problems Associated with Combat Trauma (%)**			
Traumatic Incident Identified as Worst Lifetime Event	N	%	Currently Unemployed	Recently Fired	Ever Divorced	Spousal Abuse
Combat	96	41.8	20.2	13.6	39.0	15.2
Life-threatening accident	292	5.5	7.9	9.7	18.8	7.6
Natural disaster	178	3.9	13.4	4.9	9.5	4.0
Witnessing someone being badly beaten or killed	492	6.1	7.7	4.4	11.3	5.4
Raped or sexually molested	32	32.5	4.8	3.0	12.0	3.7
Physical attack, threatened with weapon, or held captive	273	1.6	4.4	4.3	12.0	10.4
Physically abused or seriously neglected as child	58	24.2	2.6	4.0	28.3	1.5
Other qualifying trauma	152	5.1	8.3	6.3	12.2	8.0
Shock on learning of trauma to a person close to you	130	4.4	3.0	2.2	7.8	3.9

SOURCE: Adapted with permission from Prigerson et al. 2001.

Military Sexual Assault

Several factors in the military environment may be risk factors for development for PTSD but sexual assault is an important one. Suris et al. (2004) noted that woman veterans were 9 times more likely to develop PTSD if they had a history of military sexual assault. Another study (Kang et al. 2005) examined self-reported in-theater experiences of sexual harassment or assault and combat exposure and found statistically significant increases in PTSD associated with sexual assault in female and male veterans of the Gulf War.

Homecoming Environment

Lack of social support, particularly after the traumatic event, is a significant risk factor for PTSD. As soldiers return home, lack of social support from family, friends, and community is associated with PTSD, according to studies of Vietnam veterans (Fontana and Rosenheck 1994; Fontana et al. 1997a; Green et al. 1990; Johnson et al. 1997; Koenen et al. 2003; Stretch 1985; Stretch et al. 1985). The Vietnam War was unpopular and many veterans returning from combat were greeted with disrespect, hostility, or condemnation. Although many Iraq and Afghanistan veterans might be returning to more welcoming attitudes, the role of strong social, family, and community support is still important. In a meta-analysis of more than 50 studies on risk factors for PTSD in military and civilian populations, researchers found that lack of social support was a leading risk factor for development of PTSD compared with such other risk factors as lack of education, life stress, trauma severity, and other previous trauma (Figure C.1) (Brewin et al. 2000). A later meta-analysis by a team of investigators who used somewhat different methods also found that lack of social support was a strong risk factor for development of PTSD (Ozer et al. 2003).

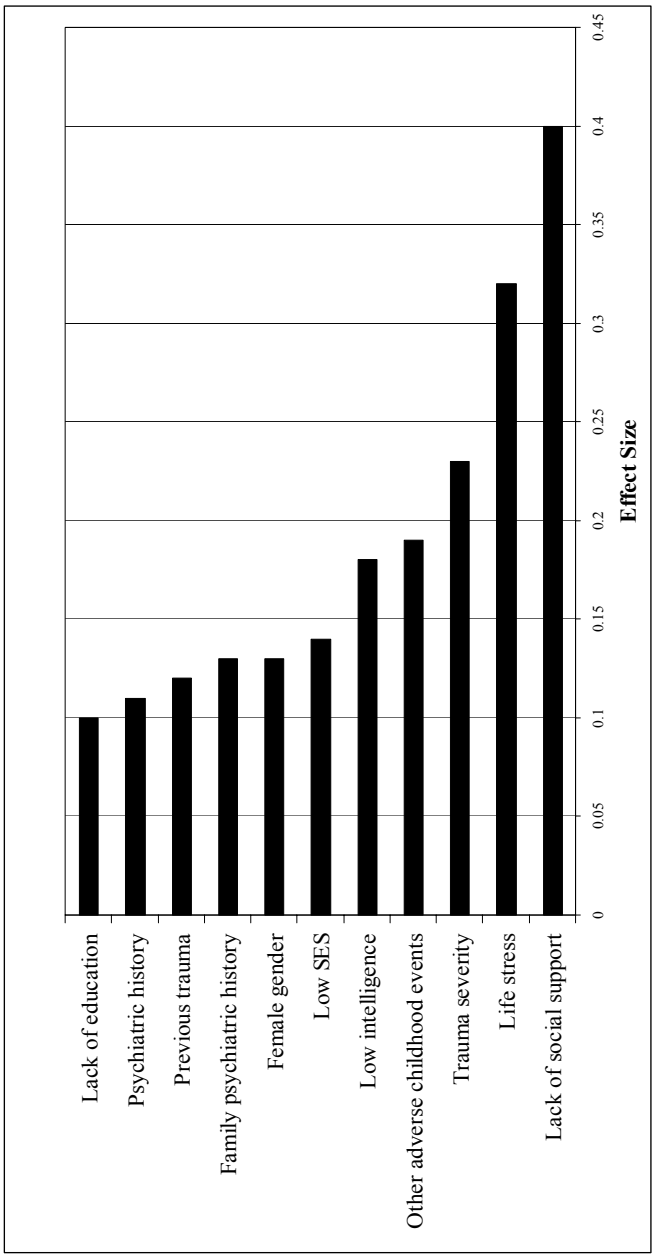

FIGURE C.1 Meta-analysis of Risk Factors for PTSD.
SOURCE: Adapted with permission from Brewin et al. 2000

Sex

In the US general population, women are about twice as likely as men to have PTSD at some point in their lives. Their lifetime prevalence is 10-12% versus 5% for men (Kessler et al. 1995; Resnick et al. 1993). It is not clear why women have higher rates of PTSD than men. That sex difference, however, is not peculiar to PTSD; women generally have higher rates of depression and anxiety disorders (Kessler et al. 1995).

Women veterans serving in the Gulf War were more likely than men to screen positive for likelihood of PTSD (Kang et al. 2003; Wolfe et al. 1999). Studies have not determined whether that is due to different exposures or specifically to inherent sex differences in the development of PTSD.

Ethnicity

After Vietnam, there was no difference in prevalence of PTSD between black, American Indian, and white veterans. Rates among blacks were higher until the investigators performed analyses to remove the effects of their having had greater combat exposure (Beals et al. 2002; Kulka et al. 1990). Still, questions linger about the ethnic minority differences, because several less representative studies reported higher rates of PTSD among black Vietnam veterans (e.g., Allen 1986; Penk et al. 1989). Latino Vietnam veterans, especially Puerto Rican veterans, had higher PTSD prevalence and more severe symptoms even after adjustment for combat exposure (Ortega and Rosenheck 2000). Members of ethnic minorities appear to have a more chronic course of PTSD as well (King et al. 1998; Koenen et al. 2003). Distinct ethnic groups might differ in how they manifest symptoms, how they describe the symptoms, how they cope, what support systems they use, and whether they seek or stay in care (Department of Health and Human Services 2001).

PROTECTIVE FACTORS

Just as risk factors likely increase a person's chances of developing PTSD, protective factors might reduce the risk. Researchers have found that protective factors include coping with the traumatic event in positive and active ways rather than by avoiding it (Benotsch et al. 2000; Norris et al. 2002; North et al. 2001), better training and preparation to respond to a traumatic event (Alvarez and Hunt 2005; Basoglu et al. 1997), higher education and income, a sense of mastery or self-esteem, and male sex (Brewin et al. 2000; Kulka et al. 1990; Orcutt et al. 2004); (Coker et al. 2005; Norris et al. 2002).

Beginning in the 1980s, research has shown that after a traumatic event, social support is associated with reduced likelihood of PTSD (e.g., Cohen and Wills 1985; Kaniasty and Norris 1997; Koenen et al. 2003; Ozer et al. 2003). The research involved largely civilians exposed to community or domestic violence. Social support is often defined as help with physical activities, emotional support, and having someone to talk with about traumatic experiences or to turn to for advice. Such social support might be provided by a network of health care and mental health care professionals as well as by family and community members (Flannery 1990).

Studies of veterans have shown that social support, particularly after homecoming, is also associated with reduced likelihood and severity of PTSD (Fontana and Rosenheck 1994; Fontana et al. 1997b; King et al. 1998). It was found that the protective effects of homecoming were greatest among those veterans who had the greatest war-zone exposures (Fontana et al. 1997a). Interestingly, Fontana et al. (1997a) also showed that having been part of a cohesive military unit did not have the protective effect of postwar social support.

One study (King et al. 1998), conducted in a sample of 1,632 Vietnam veterans from the National Vietnam Veterans Readjustment Study, found that hardiness as a personality trait was protective. Hardiness was a construct defined as having a sense of control over life, feeling that life is meaningful, and being open to change.

CONCLUSION

This appendix provided a very brief discussion of some of the risk and protective factors that might influence who will develop PTSD. Not all people who are exposed to traumatic events develop a psychiatric disorder, such as depression or PTSD. Its development can depend on the intensity of the traumatic event or stressor and on a host of pretrauma and posttrauma factors.

REFERENCES

Allen IM. 1986. Posttraumatic stress disorder among black Vietnam veterans. *Hospital and Community Psychiatry* 37(1):55-61.

Alvarez J, Hunt M. 2005. Risk and resilience in canine search and rescue handlers after 9/11. *Journal of Traumatic Stress* 18(5):497-505.

Asmundson GJ, Stein MB, McCreary DR. 2002. Posttraumatic stress disorder symptoms influence health status of deployed peacekeepers and nondeployed military personnel. *Journal of Nervous and Mental Disease* 190(12):807-815.

Basoglu M, Mineka S, Paker M, Aker T, Livanou M, Gok S. 1997. Psychological preparedness for trauma as a protective factor in survivors of torture. *Psychological Medicine* 27(6):1421-1433.

Beals J, Manson SM, Shore JH, Friedman M, Ashcraft M, Fairbank JA, Schlenger WE. 2002. The prevalence of posttraumatic stress disorder among American Indian Vietnam veterans: Disparities and context. *Journal of Traumatic Stress* 15(2):89-97.

Benotsch EG, Brailey K, Vasterling JJ, Uddo M, Constans JI, Sutker PB. 2000. War zone stress, personal and environmental resources, and PTSD symptoms in Gulf War veterans: A longitudinal perspective. *Journal of Abnormal Psychology* 109(2):205-213.

Black DW, Carney CP, Peloso PM, Woolson RF, Schwartz DA, Voelker MD, Barrett DH, Doebbeling BN. 2004. Gulf War veterans with anxiety: Prevalence, comorbidity, and risk factors. *Epidemiology* 15(2):135-142.

Breslau N, Chilcoat HD, Kessler RC, Davis GC. 1999. Previous exposure to trauma and PTSD effects of subsequent trauma: Results from the Detroit Area Survey of Trauma. *American Journal of Psychiatry* 156(6):902-907.

Brewin CR, Andrews B, Valentine JD. 2000. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology* 68(5):748-766.

Cohen S, Wills TA. 1985. Stress, social support, and the buffering hypothesis. *Psychological Bulletin* 98(2):310-357.

Coker AL, Weston R, Creson DL, Justice B, Blakeney P. 2005. PTSD symptoms among men and women survivors of intimate partner violence: The role of risk and protective factors. *Violence and Victims* 20(6):625-643.

de Jong JT, Komproe IH, Van Ommeren M, El Masri M, Araya M, Khaled N, van De Put W, Somasundaram D. 2001. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *Journal of the American Medical Association* 286(5):555-562.

Department of Health and Human Services. 2001. *Mental Health: Culture, Race, and Ethnicity*. A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

Flannery RB. 1990. Social support and psychological trauma: A methodological review. *Journal of Traumatic Stress* 3(4):593-611.

Foa EB, Zinbarg R, Rothbaum BO. 1992. Uncontrollability and unpredictability in post-traumatic stress disorder: an animal model. *Psychological Bulletin* 112(2):218-238.

Fontana A, Rosenheck R. 1994. Posttraumatic stress disorder among Vietnam Theater Veterans. A causal model of etiology in a community sample. *Journal of Nervous and Mental Disease* 182(12):677-684.

Fontana A, Rosenheck R, Horvath T. 1997a. Social support and psychopathology in the war zone. *Journal of Nervous and Mental Disease* 185(11):675-681.

Fontana A, Schwartz LS, Rosenheck R. 1997b. Posttraumatic stress disorder among female Vietnam veterans: A causal model of etiology. *American Journal of Public Health* 87(2):169-175.

Ford JD. 1999. Disorders of extreme stress following war-zone military trauma: Associated features of posttraumatic stress disorder or comorbid but distinct syndromes? *Journal of Consulting & Clinical Psychology* 67(1):3-12.

Goldberg J, True WR, Eisen SA, Henderson WG. 1990. A twin study of the effects of the Vietnam War on posttraumatic stress disorder . *Journal of the American Medical Association* 263(9):1227-1232.

Green BL, Grace MC, Lindy JD, Gleser GC, et al. 1990. Risk factors for PTSD and other diagnoses in a general sample of Vietnam veterans. *American Journal of Psychiatry* 147(6):729-733.

Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. 2004. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine* 351(1):13-22.

Ikin JF, Sim MR, Creamer MC, Forbes AB, McKenzie DP, Kelsall HL, Glass DC, McFarlane AC, Abramson MJ, Ittak P, Dwyer T, Blizzard L, Delaney KR, Horsley KWA, Harrex WK, Schwarz H. 2004. War-related psychological stressors and risk of psychological disorders in Australian veterans of the 1991 Gulf War. *British Journal of Psychiatry.* 185(Aug.):116-126.

Johnson DR, Lubin H, Rosenheck R, Fontana A, Southwick S, Charney D. 1997. The impact of homecoming reception on the development of posttraumatic stress disorder: The West Haven Homecoming Stress Scale (WHHSS). *Journal of Traumatic Stress* 10(2):259-277.

Kang H, Dalager N, Mahan C, Ishii E. 2005. The role of sexual assault on the risk of PTSD among Gulf War veterans. *Annals of Epidemiology* 15(3):191-195.

Kang HK, Natelson BH, Mahan CM, Lee KY, Murphy FM. 2003. Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: A population-based survey of 30,000 veterans. *American Journal of Epidemiology* 157(2):141-148.

Kaniasty K, Norris FH. 1997. Social support dynamics in adjustment to disasters. In: Duck S, Editor. *Handbook of Personal Relationships*. 2nd ed. New York: Wiley. Pp. 595-619.

Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. 1995. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 52(12):1048-1060.

King LA, King DW, Fairbank JA, Keane TM, Adams GA. 1998. Resilience-recovery factors in post-traumatic stress disorder among female and male Vietnam veterans: Hardiness, postwar social support, and additional stressful life events. *Journal of Personality & Social Psychology* 74(2):420-434.

Koenen KC, Stellman JM, Stellman SD, Sommer JF, Jr. 2003. Risk factors for course of posttraumatic stress disorder among Vietnam veterans: A 14-year follow-up of American Legionnaires. *Journal of Consulting and Clinical Psychology* 71(6):980-986.

Koren D, Norman D, Cohen A, Berman J, Klein EM. 2005. Increased PTSD risk with combat-related injury: A matched comparison study of injured and uninjured soldiers experiencing the same combat events. *American Journal of Psychiatry* 162(2):276-282.

Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS. 1990. *Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.

Maes M, Mylle J, Delmeire L, Janca A. 2001. Pre- and post-disaster negative life events in relation to the incidence and severity of post-traumatic stress disorder. *Psychiatry Research* 105(1-2):1-12.

Mollica RF, McInnes K, Pham T, Smith Fawzi MC, Murphy E, Lin L. 1998. The dose-effect relationships between torture and psychiatric symptoms in Vietnamese ex-political detainees and a comparison group. *Journal of Nervous and Mental Disease* 186(9):543-553.

Norris FH, Friedman MJ, Watson PJ, Byrne CM, Diaz E, Kaniasty K. 2002. 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981-2001. *Psychiatry* 65(3):207-239.

North CS, Nixon SJ, Shariat S, Mallonee S, McMillen JC, Spitznagel EL, Smith EM. 1999. Psychiatric disorders among survivors of the Oklahoma City bombing. *Journal of the American Medical Association* 282(8):755-762.

North CS, Spitznagel EL, Smith EM. 2001. A prospective study of coping after exposure to a mass murder episode. *Annals of Clinical Psychiatry* 13(2):81-87.

Orcutt HK, Erickson DJ, Wolfe J. 2004. The course of PTSD symptoms among Gulf War veterans: A growth mixture modeling approach. *Journal of Traumatic Stress* 17(3):195-202.

Ortega AN, Rosenheck R. 2000. Posttraumatic stress disorder among Hispanic Vietnam veterans. *American Journal of Psychiatry* 157(4):615-619.

O'Toole BI, Marshall RP, Grayson DA, Schureck RJ, Dobson M, Ffrench M, Pulvertaft B, Meldrum L, Bolton J, Vennard J. 1996. The Australian Vietnam Veterans Health Study: III. psychological health of Australian Vietnam veterans and its relationship to combat. *International Journal of Epidemiology* 25(2):331-340.

O'Toole BI, Marshall RP, Schureck RJ, Dobson M. 1998. Posttraumatic stress disorder and comorbidity in Australian Vietnam veterans: Risk factors, chronicity and combat. *Australian and New Zealand Journal of Psychiatry* 32(1):32-42.

Ozer EJ, Best SR, Lipsey TL, Weiss DS. 2003. Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin* 129(1):52-73.

Penk WE, Robinowitz R, Black J, Dolan M, Bell W, Dorsett D, Ames M, Noriega L. 1989. Ethnicity: Post-traumatic stress disorder (PTSD) differences among black, white, and Hispanic veterans who differ in degrees of exposure to combat in Vietnam. *Journal of Clinical Psychology* 45(5):729-735.

Prigerson HG, Maciejewski PK, Rosenheck RA. 2001. Combat trauma: Trauma with highest risk of delayed onset and unresolved posttraumatic stress disorder symptoms, unemployment, and abuse among men. *Journal of Nervous & Mental Disease* 189(2):99-108.

Prigerson HG, Maciejewski PK, Rosenheck RA. 2002. Population attributable fractions of psychiatric disorders and behavioral outcomes associated with combat exposure among US men. *American Journal of Public Health* 92(1):59-63.

Resnick HS, Kilpatrick DG, Dansky BS, Saunders BE, Best CL. 1993. Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology* 61(6):984-991.

Roy-Byrne P, Arguelles L, Vitek ME, Goldberg J, Keane TM, True WR, Pitman RK. 2004. Persistence and change of PTSD symptomatology—a longitudinal co-twin control analysis of the Vietnam Era Twin Registry. *Social Psychiatry and Psychiatric Epidemiology* 39(9):681-685.

Schreiber S, Galai-Gat T. 1993. Uncontrolled pain following physical injury as the core-trauma in post-traumatic stress disorder. *Pain* 54(1):107-110.

Southwick SM, Krystal JH, Morgan CA, Johnson D, Nagy LM, Nicolaou A, Heninger GR, Charney DS. 1993. Abnormal noradrenergic function in posttraumatic stress disorder. *Archives of General Psychiatry* 50(4):266-274.

Speed N, Engdahl B, Schwartz J, Eberly R. 1989. Posttraumatic stress disorder as a consequence of the POW experience. *Journal of Nervous and Mental Disease* 177(3):147-153.

Stretch RH. 1985. Posttraumatic stress disorder among U.S. Army Reserve Vietnam and Vietnam-era veterans. *Journal of Consulting and Clinical Psychology* 53(6):935-936.

Stretch RH, Vail JD, Maloney JP. 1985. Posttraumatic stress disorder among Army Nurse Corps Vietnam veterans. *Journal of Consulting & Clinical Psychology* 53(5):704-708.

Suris A, Lind L, Kashner TM, Borman PD, Petty F. 2004. Sexual assault in women veterans: An examination of PTSD risk, health care utilization, and cost of care. *Psychosomatic Medicine* 66(5):749-756.

Sutker PB, Allain AN Jr, Winstead DK. 1993. Psychopathology and psychiatric diagnoses of World War II Pacific theater prisoner of war survivors and combat veterans. *American Journal of Psychiatry* 150(2):240-245.

Sutker PB, Uddo M, Brailey K, Allain AN, Errera P. 1994. Psychological symptoms and psychiatric diagnoses in Operation Desert Storm troops serving graves registration duty. *Journal of Traumatic Stress* 7(2):159-71.

Wolfe J, Erickson DJ, Sharkansky EJ, King DW, King LA. 1999. Course and predictors of posttraumatic stress disorder among Gulf War veterans: A prospective analysis. *Journal of Consulting and Clinical Psychology* 67(4):520-528.