POST TRAUMATIC STRESS DISORDER (PTSD) IN EMERGENCY RESPONDERS SCOPING STUDY: LITERATURE REVIEW

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Abstract

This report aims to inform the emergency responder community about PTSD (and traumatic stress). Given that the available literature within the emergency responder community is very limited, this review relies on the military and scientific literature to explore the issue of traumatic stress and PTSD. This review focused on the following four questions:

- How should PTSD be defined, recognized and how often does it occur?
- How can traumatic stress and PTSD be prevented?
- How should traumatic stress and PTSD be treated?
- What research could support management of PTSD in the emergency responder community?

PTSD is a fully developed form of traumatic stress that is only diagnosed after experiencing symptoms for at least a month. PTSD occurs when symptoms evolve in the aftermath of an extreme traumatic stressor that overwhelms the individual's coping capacities. PTSD is a serious and potentially debilitating illness. As such, it needs to be managed effectively using established and validated treatments and tools. Deliberate efforts to manage traumatic stress are critical, particularly for organizations that require their personnel to be exposed to high-risk, traumatic situations. This review concludes with a discussion of research priorities for the emergency responder community to manage PTSD in a more systematic way.

Résume

Le présent rapport vise à fournir à la communauté des intervenants d'urgence des renseignements au sujet du trouble de stress post-traumatique (TSPT). Étant donné que les intervenants d'urgence disposent de très peu de documentation sur le traumatisme dû au stress et le TSPT, le rapport s'appuie sur la documentation militaire et scientifique. L'examen a porté sur les quatre questions suivantes :

- De quelle façon le TSPT devrait-il être défini et reconnu, et quelle est sa prévalence?

- Comment peut-on prévenir le traumatisme dû au stress et le TSPT?

- Comment devrait-on traiter le traumatisme dû au stress et le TSPT?

- Quelles recherches pourraient appuyer la prise en charge du TSPT par la communauté des intervenants d'urgence?

Le TSPT est une forme de traumatisme dû au stress ayant atteint un stade avancé, et il peut seulement être diagnostiquée chez des personnes qui présentent des symptômes depuis au moins un mois. Le TSPT se manifeste lorsque les symptômes évoluent à la suite d'un événement exceptionnellement traumatisant qui inhibe les capacités d'adaptation d'une personne. Le TSPT est une maladie grave et potentiellement invalidante. Ainsi, il doit être pris en charge efficacement à l'aide de traitements et d'outils établis et validés. Il est crucial que des efforts délibérés soient déployés pour prendre en charge le traumatisme dû au stress, en particulier au sein des organisations dont le personnel doit être exposé à des situations à risque élevé et traumatisantes. Le rapport se conclut avec une analyse des priorités en ce qui concerne les travaux de recherche à mener pour assurer une prise en charge plus systématique du TSPT par les intervenants d'urgence.

Executive Summary

PTSD in Emergency Responders Scoping Study: Literature Review

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Incorporated; CSSP-2013-CD-1115; Defence R&D Canada Toronto; November 2013.**

Deliberate efforts to manage traumatic stress are critical, particularly for organizations that require their personnel to be exposed to high-risk, traumatic situations. This report aims to inform the emergency responder community about post-traumatic stress disorder (PTSD) and traumatic stress. Given that the available literature within the emergency responder community is very limited, this review relies on the military and scientific literature. This review focused on the following four questions:

- How should PTSD be defined, recognized and how often does it occur?
- How can traumatic stress and PTSD be prevented?
- How should traumatic stress and PTSD be treated?
- What research could support management of PTSD in the emergency responder community?

PTSD is a fully developed form of traumatic stress that is only diagnosed after experiencing symptoms for at least a month. PTSD occurs when symptoms evolve in the aftermath of an extreme traumatic stressor that overwhelms a person's ability to cope. These symptoms involve re-experiencing traumatic events, avoidance, emotional numbing and increased arousal. PTSD incidence rates are generally less than 10% for members of the general population but emergency responders have been shown to have higher rates, estimated by one researcher to be about 17% (full and partial PTSD). PTSD is of particular concern because it is often associated with other challenges, such as suicide, depression and alcohol abuse.

Efforts to lessen the impact of traumatic stress and PTSD typically take the form of education and training (e.g., trying to promote higher levels of resilience and mental toughness). Research showing their efficacy for preventing or lessening PTSD is currently at an early stage. Particularly for personnel in high risk jobs, regular screening for PTSD is agreed to be a critical aspect of prevention.

Treatments for PTSD are somewhat better understood, but this area is still developing. Cognitive behaviour therapy and exposure therapy are clearly noted in the literature as "treatments of choice" for helping personnel suffering from traumatic stress. Many other informal treatments such as psychological first aid and social support are noted to be helpful approaches but are much less established. Personnel who are exposed to traumatic stress must be quickly evaluated to ensure their safety and should be referred to mental health professionals if displaying problematic or atypical behaviour.

As this review shows, then, PTSD is a serious and potentially debilitating illness. As such, it needs to be managed effectively using established and validated treatments and tools. This review concludes with a discussion of research priorities to support the emergency responder community in managing traumatic stress and PTSD.

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1. Background and Method

The Statement of Work (Wood, 2013) for this project presents the following objective:

"...to conduct a review of work done for the Canadian Forces on Post-Traumatic Stress Disorder (PTSD) to identify previous work that has relevance to the Canadian First Responder communities (Fire, Paramedic and Police and Law Enforcement) and the Canadian First Receiver communities (emergency room staff and other front line medical staff)."

This review is intended to identify research from other areas (e.g., military) that offers a strong basis for managing PTSD in first responders/receivers, as well as to help identify areas that currently lack a strong empirical base that could be addressed in future research.

To meet this objective, the project team defined a typical methodology used to conduct reviews of the literature, searched relevant databases and filtered the literature retrieved to arrive at the most important research articles for informing the first responder/receiver communities. This process is described more in the chapter that follows, and the results of the literature review are presented throughout the remainder of this report.

1.1 Keywords

To begin, a keyword list was generated. This process involved a brainstorming session with all members of the research team, and relied on their cumulative knowledge and experience with the pertinent scientific, psychological and military domains. The keywords were developed to focus the literature search. The team established a number of core concepts, as shown in Table 1.

Table 1: Keywords

Core Concept	Primary Keywords
Post-Traumatic Stress Disorder	Posttraumatic, post-traumatic, stress disorder, PTSD, traumatic stress disorder
Emergency responders	Police, police officers, fire, firefighters, ambulance, EMS, paramedics, medical, first responders, rescuers, disaster relief, first receivers, nurses, physicians, health care
PTSD-related	Treatment, risk factor, assessment, comorbidity, prevention, predictors, trauma, vicarious trauma, repeated exposure

After establishing the core concepts, primary keywords were then developed. The core concepts were the most important words used in the search as they represented the broad constructs relevant to the research questions. The primary keywords ensured sampling of literature from several different domains within the core construct, and their use was guided by what emerged from the core concepts. This resulted in refining the search to the most relevant articles.

1.2　Databases

The databases most relevant for searching the scientific, academic, and military literatures relevant to influence target profiling are shown in Table 2.

Table 2: Databases used

Database	Description (directly from relevant websites)
PsycINFO	The PsycINFO database is a collection of electronically stored bibliographic references, often with abstracts or summaries, to psychological literature from the 1800s to the present. The available literature includes material published in 50 countries, but is all presented in English. Books and chapters published worldwide are also covered in the database, as well as technical reports and dissertations from the last several decades.
PILOTS	The PILOTS Database is an electronic index to the worldwide literature on PTSD and other mental health consequences of exposure to traumatic events. Unlike other databases, the PILOTS Database does not restrict its coverage to articles appearing in selected journals. It attempts to include all publications relevant to PTSD and other forms of traumatic stress, whatever their origin without disciplinary, linguistic, or geographic limitations.
PubMed	PubMed is a free online database with over 22 million references covering biomedicine, bioengineering, and the behavioural sciences. It was developed by the National Center for Biotechnology Information (NCBI) at the National Institutes of Health (NIH). The database provides citations and abstracts, with some access to full-text articles. Traditionally, PubMed has been tightly linked with MEDLINE, but is not limited to medical content.
DTIC (Formerly STINET)	Defense Technical Information Center Online is available to the Public, free of charge. It provides access to citations of unclassified unlimited documents that have been entered into the center's reports collection, as well as the electronic full-text of many of these documents. DTIC Online also provides access to the Air University Library Index to Military Periodicals, Staff College Automated Military Periodical Index, Department of Defense Index to Specifications and Standards, and Research and Development Descriptive Summaries.
Google Scholar	Google Scholar is a specialty search engine maintained by Google which contains academic articles and presentations. Many disciplines are represented, and sources include articles, books, and abstracts from academic publishers, professional societies, online repositories, universities, and other web sites. Google scholar attempts to rank documents based on the full text of each document, where it was published, who it was written by, how recently it was cited, and how often it was cited in other scholarly literature.
DRDC Research Reports	DRDC Defence Research Reports is a database of scientific and technical research produced by and for Defence Research & Development Canada. It is available online at pubs.drdc-rddc.gc.ca/pubdocs/pcow1_e.html.

1.3　Selection and Review

The search of the databases generated more than 150 titles and abstracts. The research team reviewed these and scanned each abstract for relevance. Priority was given to those articles that represented the core concepts. Once titles and abstracts were ranked according to relevance, the research team obtained as many of the primary articles as possible. Overall, the references comprised books, journal articles, and technical reports from the behavioural sciences, military, and related domains.

Once articles were obtained, researchers began to review and comment on the articles that pertained to various sections of the report. After reviewing a number of articles and chapters, the research team developed a broad outline of the major issues. This outline was used to further categorize the applicability of the remaining articles and to further focus the review of the remaining obtained articles. In all, more than 70 primary articles were reviewed in addition to many secondary sources.

1.4　Structure of the Report

Chapter 1 of this report provides the background for the current project describes the method used to initiate the review and presents the scope of the work and the deliverables. Chapter 2definespost-traumatic stress disorder (PTSD), explores the symptoms and incidence rates and introduces the traumatic stress continuum. Chapter 3addresses the prevention of traumatic stress and PTSD, and Chapter 5 explores many treatments available to manage traumatic stress. Chapter 5identifies the current gaps in

both research and practice that should be addressed by the first responder/receiver community to manage traumatic stress and PTSD.

Importantly, this report is organized such that personnel interested only in the basic conclusions emerging from the literature can easily turn to the "take-home" message in the last section of each chapter rather than reading through all of the supporting materials that shaped the conclusions.

1.5   Scope

Although our primary focus was on PTSD, our review considers both the initial stages of developing PTSD (i.e., acute stress reaction and acute stress disorder), as well as PTSD. Understanding the entire traumatic stress continuum is critical to managing PTSD successfully.

In exploring the many available treatments for PTSD, we explored psychotherapeutic approaches, and to a more limited extent, pharmacological approaches. However, in-depth discussions about medication and pharmacological approaches to treating PTSD are outside our area of expertise and were judged to be beyond the scope of this review. However, as the available literature did provide some clear direction about the efficacy of some broad categories of medication, we report these broad patterns when consistent and seemingly backed by strong research but avoid commenting or delving deeply into pharmacological treatments.

1.6   Limitations

To the extent possible, this review attempts to provide insight about the current "best practices" within the military domain. Although this review was initially expected to focus on the Canadian military, we found relatively little high quality information from this domain. This may be because the Canadian military's approach to managing PTSD has been slowly but steadily evolving in recent years (English, 2012). As such, research examining the effectiveness of the approaches that are still being developed may not have been published yet. Although obviously very different from the Canadian military system, PTSD management within the U.S. military is much more developed and the scientific quality of the work that we accessed from this system was high. In particular, a document from the Department of Defense and Veterans Affairs (DoD, 2010) provided the most comprehensive review of the literature and resultant "best practice" guidelines for managing traumatic stress. However, given that this document was the most developed and relevant to the problem at hand, we relied on it heavily, and this is potential limitation of this report. On the other hand, our review also used many other research reports relevant to the problem at hand and these were used to ensure that the best practices outlined in the DoD (2010) were indicative of those in the broader traumatic stress literature. Moreover, these other research reports also informed several conclusions made in this report that differ somewhat from the DoD best practices. Overall, then, we believe that we have used the best available evidence (DoD, 2010 and other research) with a critical eye rather than unquestioning acceptance.

Another limitation of this review is that although the ultimate focus is on the first responder/receiver community, we could access only a few papers of sufficient quality to inform our review, suggesting that this body of literature requires more time to develop. Moreover, the "best practices" identified in this report are basely solely on the available literature and the consistent (and to the extent possible, empirically-based) practices identified within this literature. Nonetheless, their quality is wholly dependent on the quality of the literature used in this review. We believe that this report represents the broad conclusions expressed within the available literature, and that we have interpreted this literature properly as competent and experienced researchers. However, the best practices identified in this report should be validated with PTSD and traumatic stress experts before being implemented. [1]

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[1] This issue is discussed more in Chapter 5.

Another limitation of this review is that the depth of coverage of the relevant issues varies considerably. While completing this review, it became clear that many diverse literatures are relevant to the question at hand. Given the limited number of articles available to review (with the constraints of time and budget), we focused on as many of the most relevant areas as possible, while attempting to provide the best possible foundation for understanding the key questions at hand. Moreover, given the number of relevant topics, some sections in this report rely on a very small number of papers found during our search. Obviously, it is impossible to make strong conclusions about a complex topic on the basis of only a few research reports. Nonetheless, we have worked to represent the available literature accurately and to describe current best practices found in the literature and to identify the most critical gaps that will hopefully be filled with future research.

2.   Defining and Recognizing PTSD

Managing PTSD in first responders and receivers will require understanding its definition, recognizing the symptoms associated with PTSD and knowing how PTSD relates to the broader traumatic stress continuum. This chapter explores these issues.

2.1   First Responder/Receiver Context

First responders are typically defined as police officers, firefighters, search and rescue (SAR) personnel and ambulance personnel (Haugen, Evces & Weiss, 2012). In the available literature, first receivers are defined primarily as medical personnel (e.g., physicians, nurses and support personnel). Together, these two groups can be called emergency responders.

In a systematic review of the literature relevant to PTSD in first responders, Haugen et al. (2012) note a range of relevant situations that first responders often face which include exposure to risk of (or actual) severe injury or death and witnessing or participating in rescues to prevent injury or death. Specific examples (DOD, 2010; Haugen et al. 2012) of high-stress events that have been linked to acute stress reactions include:

- Exposure to the sudden or unexpected death of others; witnessing or participating in rescues to prevent injury or death
- Highly emotional events (e.g., searching for survivors who may be dying);
- Extreme fatigue, weather exposure, hunger;
- Extended exposure to danger or emotional/physical strain;
- Exposure to environmental hazards, such as toxic contamination.

As their occupation often involves routine exposure to both physical and psychological stressors, first responders have been recognized to be at particular risk of developing PTSD (Haugen et al., 2012). This suggests that it is important to understand what post-traumatic stress is and how it can best be managed.

2.2   Definition

Although the term "PTSD" is sometimes used informally as a catch-all term, it is actually a specific and formal term for a diagnosed form of traumatic stress. In 1980, PTSD was coded as a distinct mental health issue by the American Psychiatric Association (APA, 1980), as a way of capturing the observation of a consistent and persistent set of symptoms sometimes associated with experiencing trauma. The APA defines a diagnosis of PTSD as requiring that "a person must have experienced, witnessed or confronted death or serious bodily injury to self or others and responded with intense fear, helplessness, or horror" (APA, 2000). PTSD can be defined as "a condition where symptoms evolve in the aftermath of an extreme traumatic stressor that overwhelms the individual's coping capacities (Gupta, 2013, p. 86). PTSD is best described as a progressive symptomatic response to traumatic stress that fails to recede after at least 30 days. The diagnosis of PTSD is made by a professional (e.g., physician or psychiatrist), ideally by combining observation with standardized and validated measurement instruments. PTSD is typically recognized as occurring in response to a clearly defined event at a particular point in time (Forneris, Gartlehner, Brownley, Gaynes, Sonis et al., 2013). These definitions of PTSD show that trauma is defined as an atypical and discrete stressor that is different from day-to-day pressures and hassles that people typically face.

Due to the relative newness of the construct, the understanding of PTSD (i.e. definition) is continually evolving. Although earlier accounts of PTSD focused on direct exposure to trauma, more recent

definitions of PTSD (DSM V; American Psychiatric Association, 2013) describe direct and indirect events that could trigger PTSD, as follows:

- directly experiencing a traumatic event;
- witnessing a traumatic event in person;
- learning that a traumatic event (violent or accidental) happened to a loved one; and
- experiencing repeated or extreme exposure to details of a traumatic event.

There is good evidence in the literature that even indirect exposure to trauma (as occurred in 9/11 media coverage and interest) may promote PTSD. Neria, Digrande and Adams (2011) note there is some evidence of traumatic responses even in communities quite remote from 9/11, and this observation challenges the conventional understanding of traumatic stress as requiring direct and personal exposure. This shift is an important one for the emergency responder community, as it indicates the need to consider both personnel who respond directly on the scene of emergencies as well as personnel who are more indirectly exposed to the results of trauma.

Another shift has been the re-categorization of PTSD from an Anxiety Disorder (DSM-IV) to falling under Trauma and Stress-or-Related Disorders in DSM-V. This shift seems consistent with increasing understanding of PTSD as being more than a "character flaw" or as almost a product of weakness rather than as a reasonable response to trauma, where natural coping strategies are sometimes overwhelmed. PTSD is diagnosed when the disturbance lasts for more than one month. Although previous iterations of the definition (DSM-IV) distinguished between acute PTSD (showing stress symptoms up to 3 months after initial exposure) and chronic PTSD (continuing to display symptoms after more than 3 months), the newer DMS-V definition does not differentiate between chronic and acute PTSD (APA, 2013).Furthermore, compared to the DSM-IV, the DMS-V more clearly specifies what constitutes a traumatic event (e.g., sexual assault). These shifts represent the increasing sophistication with which the conceptualization of PTSD continues to evolve.[2]

Whatever the definition, however, there is increasing recognition of PTSD in recent years and continued calls for organizations to protect personnel from PTSD. For example, very recent media reports underlie the problems faced by some first responders in Canada (CBC News, 2013). The Royal Canadian Mounted Police (RCMP) is being criticized for not doing enough to help their officers manage job-related stress (CBC News, 2013). RCMP stress-management programs are managed through Veterans Affairs. According to their numbers, about 1100 personnel were diagnosed as having stress-related injuries five years ago, but reports are that these numbers have since doubled. Although the RCMP credits this increase to better awareness and a decrease in stigmatization associated with asking for help, RCMP officers struggling with PTSD report not feeling validated and supported by the system (CBC News, 2013). This suggests the need for all organizations requiring their personnel to work in high-risk environments to understand what PTSD is, how it can be detected, and how it is best managed.

2.3   Symptoms and Emergence of PTSD

PTSD is typically defined as involving three related but distinguishable sets of symptoms (Bisson& Andrew, 2007; Haugen et al., 2012; DoD, 2010), as follows:[3]

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[2]In the International Classification of Diseases Version 10 (ICD-10), used by the World Health Organization (WHO), the diagnosis of PTSD slightly differs from that in the DSM-5. The ICD-10 does not list a subjective stressor criterion, does not mention numbing or foreshortened future, and does not address functional impairment. Furthermore, the ICD-10 specifies that the onset of PTSD must occur within six months of the event (National Center for PTSD, 2013; Peters, Slade, & Andrews, 1999).

[3]According to the DSM-IV (1994), the diagnosis of PTSD requires that in reaction to a traumatic event, the individual experiences at least 1 of 5 re-experiencing symptoms (cluster B), a minimum of 3 of 7 avoidance/numbing symptoms (cluster C), and at least 2 of 5 hyperarousal symptoms (cluster D).

- Re-experiencing traumatic events – recurring distressing thoughts that can include intrusive memories, nightmares, flashbacks, heightened emotional/physical reactions
- Avoidance, emotional numbing – trying to avoid or not discuss a traumatic event, excessive rumination, loss of interest, less interest in activities and detachment from people
- Hyper-arousal (e.g., unusual agitation, sleep disturbance, irritability or anger, hyper-vigilance, problems concentrating, exaggerated startle response).

A diagnosis of PTSD also requires evidence of significant impairment or distress and at least three dissociative symptoms (Foa, Gillam & Bryant, 2013). Dissociation (breaks from reality that can vary between daydreaming and full-blown psychotic breakdowns) is seen as particularly important because it has been shown that failure to process traumatic emotions and memories immediately after a traumatic event is associated with higher probability of developing PTSD (e.g., Marchand, Boyer, Nadeau & Martin, 2013).

The symptoms of PTSD can be manifested physically, cognitively, emotional or behaviourally, and a broader list of specific symptoms is shown in Figure 1.

Physical	Cognitive/Mental	Emotional	Behavioral
• Chills	• Blaming someone	• Agitation	• Increased alcohol consumption
• Difficulty breathing	• Change in alertness	• Anxiety	• Antisocial acts
• Dizziness	• Confusion	• Apprehension	• Change in activity
• Elevated blood pressure	• Hyper-vigilance	• Denial	• Change in communication
• Fainting	• Increased or decreased awareness of surroundings	• Depression	• Change in sexual functioning
• Fatigue		• Emotional shock	
• Grinding teeth	• Intrusive images	• Fear	• Change in speech pattern
• Headaches	• Memory problems	• Feeling overwhelmed	• Emotional outbursts
• Muscle tremors	• Nightmares	• Grief	• Inability to rest
• Nausea	• Poor abstract thinking	• Guilt	• Change in appetite
• Pain	• Poor attention	• Inappropriate emotional response	• Pacing
• Profuse sweating	• Poor concentration		• Startle reflex intensified
• Rapid heart rate	• Poor decision-making	• Irritability	• Suspiciousness
• Twitches	• Poor problem solving	• Loss of emotional control	• Social withdrawal
• Weakness			

Figure 1: Common Symptoms Following Exposure to Trauma (DOD, 2010, p. 30)

Of course, individuals exposed to traumatic stress will show only some unique subset of the symptoms. One person might withdraw and become very isolated, whereas another person might "act out" aggressively in daily life. Although personnel can show symptoms after exposure to one traumatic event, symptoms can also present only after continuous or reoccurring exposure to traumatic events.

There is increasing recognition in the literature that some people exposed to trauma sometimes show delayed onset PTSD (e.g., Berninger, Webber, Niles, Gustave, Lee et al., 2010b), defined as occurring when PTSD symptoms begin at least 6 months <u>after</u> exposure to a stressor (DSM IV). Foa et al. (2013) argue that only about 15% of PTSD cases occur with delayed onset in the civilian population, but that delayed onset is more frequent within military contexts (Andrew, Brewin, Philpott & Stewart, 2007; cited in Foa et al., 2013).

Research by Smid, Mooren, Van der Mast, Gersons and Kleber (2009) involved a meta-analysis of research conducted between 1980 and 2008 exploring both longitudinal and prospective studies. This meta-analysis included 24 studies (n = 6182) that assessed participants at least at the 1 and 6 month points (after exposure) and then subsequently at least 12 months after the event. Of the PTSD cases observed, 24.8% of them were determined to be delayed onset PTSD. Moreover, participants who were observed to have some signs of PTSD soon after the trauma (e.g., showing 2 of 3 symptom criteria) were shown to be at increased risk of full-blown delayed PTSD over the course of time. Results from the studies with military personnel showed them to be at particular risk of delayed PTSD. This was argued to be related to the unique nature of military service, because reacting to stress during combat is not adaptive. Moreover, social norms that stigmatize showing distress might also delay the expression of symptoms, and the social nature of the military (e.g., cohesion and strong sense of belonging) may protect personnel from dealing with the stresses until these support systems diminish once outside of the group context. Based on this research, then, the authors argue that the "conclusion that delayed PTSD most often represents progressive addition of more symptoms over time appears justified" (p. 1578). Further, they argue that these early trauma-related symptoms (e.g., intrusive memories, more pronounced startle reactions, sleep and concentration disturbances) may "increase allostatic load and the risk of PTSD" (p. 1578). Further, they conclude that "Sub-threshold symptoms of PTSD merit clinical attention in individuals seeking professional help because they appear to confer an increased risk of delayed PTSD" (Smid et al., 2009, p. 1579).

Sub-threshold PTSD, also referred to as subsyndromal PTSD and partial PTSD, is defined as showing some symptoms of posttraumatic stress disorder, but with too few to meet the criteria for PTSD (Yarvis & Schiess, 2008; Cukor, Wyka, Mella, Olden, Jayasinghe et al., 2010). Proponents argue that individuals may still display significant impairment while not meeting all the PTSD criteria for all of the symptoms (Cukor et al., 2010). This shows the importance of considering PTSD as a continuum rather than as either relevant or not relevant to a particular person.

Some effort has been devoted to understanding why some people recover fully after exposure to a traumatic event and some get PTSD, but there are no obvious certainties available in the literature. Although there are many possible reasons, Feldner, Monson and Friedman (2007) identifies a number of possible mechanisms by which PTSD can occur, as shown in Table 3:

Table 3: Mechanisms to Explain PTSD (adapted from Feldner et al., 2007, p. 83-86)

Mechanisms	Description
Learning	PTSD can involve fear-based learning. This learning can lead to avoidance. Fears that are not confronted are less likely to be which then sustains what is learned
Information Processing	Failure to mesh information about the traumatic event into one's system of beliefs and assumptions (e.g., shattering of "just world" assumptions)
Memory	Disorganized or fragmented memories with strong negative associations – hyper-accessible but not easily integrated into existing memory structures
Psychobiology	Trauma activates stress reaction systems in the body (e.g., stress hormones) that do not adequately recover

This suggests that how people learn, process information, organize and use the information in their memory and their biology may all influence their probability of developing PTSD. Other research by Charuvusta and Cloitre (2008) emphasizes the emotional and social aspects of PTSD. From this perspective, PTSD is described as the failure to control intensely emotional memories associated with trauma, and this leads to PTSD.

An important question is whether there are any characteristics that might help to distinguish what types of people are most at risk of developing PTSD. In the literature, risk factors are described in terms of factors existing before the trauma, those associated with the trauma itself and factors in play after the trauma has occurred. Specific risk factors in each of these 3 categories are shown in Table 4.

Table 4: Risk Factors for Developing ASD/PTSD (DoD, 2010, p. 22)

Pre-traumatic factors	Peri-traumatic (related to trauma itself)	Post-traumatic factors
Ongoing life stress	Severe trauma	Ongoing life stress
Lack of social support	Physical injury to self or other	Lack of positive social support
Young age at time of trauma	Type of trauma as human-induced (e.g., combat, killing another person, torture, rape or assault)	Bereavement or traumatic grief
Pre-existing psychiatric disorders or substance abuse	High perceived threat to self or others	Major loss of resources
History of traumatic events (e.g., motor vehicle accident)	Community (mass) trauma	Negative social support (shaming or blaming environment)
History of PTSD	History of peri-traumatic dissociation and interpersonal trauma	Poor coping skills
Other factors (female gender, low socioeconomic status, low education, problematic family history, poor training or prep for traumatic event)		Other post-traumatic factors, including: children at home and/or a distressed spouse.

Although these factors are somewhat self-explanatory, it is important to highlight some of the information in this table.

First, at the pre-trauma stage, there is good evidence that people who already have high levels of stress in their lives and those with fewer social supports are more likely to develop PTSD. Not surprisingly, people with mental health challenges or those with past incidences of exposure to trauma that resulted in PTSD will also be more likely to experience stress-related issues. Experience with early life trauma and violence increases the risk of PTSD (Berntsen, Johannessen, Thomsen, Bertelsen, Hoyle et al.2012). As Table 4

shows, women are often reported to be more likely to develop PTSD than men. However, the influence of gender is somewhat variable in the literature available for this review, and there is even some research showing no differences in PTSD rates among males and females (Lilly, Pole, Best, Metzler, & Marmar, 2009). As such, we concur with other researchers who note the need for deeper scientific study of this apparent trend (e.g., Keane, Marshall & Taft, 2006). Age is not a factor associated with PTSD, and racial/ethnic status is a minor predictor with socioeconomic status (r = .14) and education (r = .10) somewhat more influential factors.

The nature of one's exposure to trauma can also influence the probability of developing PTSD. More severe trauma is obviously more likely to lead to PTSD. For example, the literature shows that direct contact with victims (Fullerton et al., 2004) increases the probability of PTSD. Proximity to trauma (closer is more problematic than more distant), witnessing the death of peers and performing an atypical role in a disaster situation have been shown in 9/11 research to increase risk of trauma (Berninger et al., 2010a). Sustaining physical injury is also associated with higher probability of developed PTSD (MacGregor et al., 2009) and experiencing events like rape or molestation alsoincrease one's risk (Keane et al., 2006). Rates of PTSD associated with varying types of trauma are shown in Table 5 (Kessler, Berglund, Demler, Jin, Merikangas et al., 2005).

Table 5: PTSD Rates by Type of Trauma

Type of trauma	Incidence of PTSD
Rape	65% of men, 46% of women
Combat	38.8%
Childhood neglect	23.9% of men, 48.5% of women
Childhood physical abuse	22.3% of men
Sexual molestation	26.5% of women
Physical assault	21.3% of women
Being threatened by a weapon	32.6% of women

Interestingly, all of the traumas listed in this table have a human origin, and traumas such as natural disasters are apparently less likely to be linked to PTSD. When trauma is seen to be associated with human intent, traumatic stress is more likely than when trauma is non-personal. Charuvusta and Cloitre (2008, p. 303) note that "Traumatic injuries caused by other people are the most likely to lead to PTSD". Research conducted with first responders to 9/11 also speaks to potential risk factors. Neria et al. (2011) clearly identify risk factors for PTSD emerging from research exploring the impact of 9/11. They indicate that "loss of life of significant others, physical injury, and immediate risk of life were especially predictive of PTSD" (p. 440). Within the first responder/receiver community, then, additional supports may be required when the nature of the stress is human-induced.

After exposure to trauma, a number of factors have been shown to influence the probability of developing PTSD. As shown in the far right column, social supports and coping skills of the person exposed to trauma seem to be the best predictors of whether people exposed to trauma will work through the trauma or progress toward developing PTSD. The literature distinguishes between positive and negative coping strategies that can influence PTSD outcomes. For example, using humour (even dark humour) and using active coping strategies (e.g., working through the meaning of the events with loved ones) are seen as helping to decrease the likelihood of developing PTSD. On the other hand, more passive or detached strategies such as increased alcohol or drug use or withdrawal from support system can increase the risks of developing PTSD. After having experienced traumatic stress, living within systems that continue to impose life stress can also make it more difficult to recover from the event without progressing to symptoms of PTSD (Institute of Medicine, 2012; DoD, 2010).

2.4   Prevalence of PTSD

Understanding the prevalence of PTSD requires understanding how often people are exposed to traumatic events. Studies show between 61% of adults in Kessler's National Co-Morbidity Study (Kessler et al., 1995) as having been exposed to traumatic stressors.

Relative to these high exposure rates, then, only some people exposed to traumatic stressors actually develop PTSD. Of people exposed to trauma, some studies have shown that as many as 33% of people develop PTSD (Norris & Sloane, 2007; cited in Forneris et al., 2013). However, the more typical assertion is that a small minority of people exposed to trauma actually go on to develop PTSD (Foa et al., 2013). In large scale sample research conducted in the United States, PTSD was assessed in Kessler's National Co-Morbidity Study as having a lifetime prevalence of 7.8% overall (Kessler, Sonnega, Bromet, Hughes & Nelson, 1995), with women (10.4%) reported to be twice as likely to experience PTSD as men (5%). A replication of this study (Kessler et al., 2005; cited in Keane et al., 2006) is reported to have shown a similar overall prevalence rate of 6.8%. Another study by Neria, Nandi & Galea (2008) showed PTSD incidence rates of 30-40% in direct victims of trauma, 10-20% in rescue workers, and in 5-10% in the general population. However, there is also good evidence that PTSD rates are higher in non-Western and less developed countries, and those with conflict and ethnic strife (Keane et al., 2006).[4]

In high risk groups like military personnel who are often exposed to more frequent or more serious trauma, incidence rates for developing PTSD are reported to be higher. Studies of Vietnam veterans in the United States show 15% of male veterans and 9% of female veterans having PTSD when assessed and up to 30% of them meeting the criteria for lifetime PTSD (Keane et al., 2006). Incidence estimates of PTSD within the U.S. military system for the 2.6 million personnel having served in Iraq or Afghanistan since 2001[5] vary between 13% and 20%. Research from the U.S. Department of Veteran Affairs (2008; cited in Albright & Thyer, 2010) using data from 2002 to 2008 suggests that 40% of veterans from Iraq and Afghanistan had possible mental disorders (e.g., depression) with 20% of these as probably having PTSD. Estimates for veterans in Operation Iraqi Freedom and Enduring Freedom are that between 5 and 20% of veterans met the criteria for PTSD (Ramchand et al., 2010; cited in Steenkamp & Litz, 2013). The incidence of PTSD in peacekeepers was shown to be 8% for soldiers returning from missions in Somalia (Litz et al., 1997; cited in Keane et al., 2006) with 6.5% of a sample of veterans meeting the criteria for delayed PTSD (Gray et al., 2004; cited in Keane et al., 2006).

Incidence rates for first responders are typically reported to be notably higher than for people in the normal population. Haugen et al. (2012) note the absence of a "nationally representative, large-scale study of first responders" (p. 371). Only small scale studies have explored the incidence of PTSD in first responders. One study that used self-report (rather than "gold standard structured interviews") showed that of 132 Canadian police officers, 6.8% were reported to have partial PTSD after exposure to a traumatic stressor and 7.6% were reported to have full blown PTSD (Marchand et al., 2013).Research by Berger et al. (2012) provides the best estimate of the worldwide presence of PTSD in rescue workers, based on 28 different studies, representing a total sample of 20,242 rescuers across the world. Their results showed an average of about 10% of rescue workers meeting the criteria for full-blown PTSD that could benefit from treatment. This figure, they argue, is higher than in the normal population. Of the nearly 60,000 emergency services personnel who responded to 9/11, the cumulative rates of probable PTSD is estimated to be 9.3% for police officers and 31.9% for non-police rescue and recovery workers (Wisnivesky et al., 2011; cited in Haugen et al., 2013). Haugen et al. (2012) estimates up about 17.7% of emergency services personnel showing either partial or full PTSD.

An important question, given the diversity of first responder roles, is whether all types of first responders are equally likely to be affected. There is some suggestion in the literature that police officers have lower rates of PTSD, with Berger, Coutinho, Figueira, Marques-Portella, Luz et al. (2012) showing ambulance

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[4]Different types of trauma are related to higher rates of PTSD, as discussed in Section 2.3.
[5]This number includes 900,000 personnel who have been deployed more than once.

and firefighters as having higher rates of PTSD. Possible explanations for this are differences in screening, training, different types of exposures and prior exposure in other similar settings (e.g., military). In general, however, our review showed no obvious and agreed upon pattern of incidence rates of PTSD for varying types of first responders. [6]

However, of personnel suffering from PTSD, "only a minority of those exposed remain chronically symptomatic" (Haugen et al., 2012, p. 372). However, Haugen et al. (2012) note that even personnel suffering from partial PTSD (some symptoms) may still suffer significant impairments in functioning (Kassam-Adams, Fleisher & Winston, 2009; cited in Haugen et al., 2012). This suggests that proper treatment combined with natural resilience can help affected personnel to overcome traumatic stress challenges.

The time course of exposure to traumatic stress, however, is important to highlight.[7] For example, research has shown that 94% of rape victims displayed stress symptoms within the first week after the assault, but only 47% of these victims continued to show symptoms about 11 weeks later (Rothbaum, Foa, Riggs, Murdock & Walsh, 1992; cited in Foa et al., 2013). Another study showed 50% of women and 70% of men showing PTSD-related symptoms within 19 days after being assaulted, but this number had dropped to 21% for women and 0% for men after 4 months (Riggs, Rothbaum & Foa, 1995; cited in Foa et al., 2013). These two studies confirm the broader point made in the literature that the highest levels of remission are typically noted within the first 12 months after diagnosis (Institute of Medicine (IOM, 2012). Other longitudinal studies have also followed the time course of PTSD. Berninger et al. (2010) reported a jump in rescue workers from 8.6% within the first 6 months after 9/11 to 11.1% three to four years after 9/11. Related data from the same authors show progressive increases from 9.8%, 9.9%, 11.7% and 10.6% from Years 1 to 4 respectively. Research by Neria et al. (2011) systematically assessed the evidence about the time course of PTSD after exposure to the trauma of 9/11. This research explored symptoms of PTSD in community samples, and most relevant to this report, within rescue and recovery workers who responded to 9/11. They found 10 studies conducted within the first 5 years after 9/11, with 3 of these focused on firefighters, two on disaster relief personnel, two on utility groups and two on mixed samples. The most common research design was cross-sectional with one using a longitudinal design. Rates of PTSD in rescue workers as shown in the studies reviewed vary according to the time since exposure, as shown in Table 6 (all references in Neria et al., 2011).

Table 6: Prevalence of PTSD after 9/11

Category of personnel	Time frame	Prevalence
Rescue workers	10-61 months after 9/11	11.1%
Rescue workers	17 to 27 months	5.9%
Rescue workers	2 to 3 years	12.4%
Firefighters	4 to 6 years	22%
Utility workers	17 to 27 months	5.9%
Utility workers	10 to 34 months	8%

This table shows serious differences in rates of PTSD among personnel from different professions but over varying time frames. For the emergency community, then, this seems to indicate that the full impact of exposure to trauma cannot necessary be known even in the months immediately following the traumatic event.

Neria et al. (2011) emphasize the role of ongoing stress in their analysis of PTSD after 9/11. They note that for many responders, 9/11 was not a single event that occurred on Sept. 11, but that the stress to

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[6] Unfortunately, we found no clear patterns for first receivers in the available literature either.
[7] This is explored in more detail in Section 2.5 related to the traumatic stress continuum.

which they were exposed lasted days, weeks and even months. Interestingly, they cite research by Adams and Boscarino (2006; cited in Neria et al., 2011) showing that personnel who had experienced a higher number of traumatic events (unrelated to 9/11) in the 2 years after 9/11 showed more symptoms of PTSD. This suggests that continued exposure to stressors may accumulate to create more experience of trauma and heighten the risk of developing PTSD.

Interestingly, research by Berger et al. (2012) looking at 9/11 rescuers found no difference in PTSD rates for men and women, and no difference in incidence rates for professional vs. non-professional rescuers. They explain that volunteers may self-select, with particularly resilient volunteers more likely to want to help in emergency situations. Lastly, one interesting finding was that the prevalence PTSD among rescue workers did not vary when they had encountered a traumatic and major disaster vs. the execution of their daily routines responses to situations (but not major disasters). They explain this interesting finding from a "buffering" perspective, namely that when exposed to the trauma of major disasters, trauma workers are likely to get more support from their social networks because their trauma and need for support is evident from the nature of the event. On the other hand, in more day-to-day trauma situations, the outpouring of support may not occur. This suggests the need for "implementing continuous effective preventative measures for PTSD" for rescue workers, and not only after disaster-related trauma.

For people who do develop chronic PTSD, the path can be a very difficult one. Even though many PTSD treatments have been shown to be somewhat effective, the fact remains that many people will continue to show PTSD symptoms even with treatment (Bradley, 2005; cited in Roberts, Kitchiner, Kenardy & Bisson, 2009b). Other epidemiological research shows that about 33% of people with acute PTSD show trauma-related symptoms for 6 years or longer (IOM, 2012). From the perspective of organizations supporting these people, then, whatever preventative or treatment approaches might lessen the seriousness of the impact of traumatic stress or lessen its tenure might be cost and resource effective.

At the same time, however, this research also highlights another important point made within the traumatic stress literature; namely, even that people exposed to traumatic stressors can be highly resilient to stress. Moreover, even people showing short-lived but sub-clinical trauma symptoms often spontaneously recover even without assistance (e.g., Bonanno, 2004). Although many people are exposed to trauma, only a small subset will develop a problem with PTSD, suggesting the human potential for managing trauma fairly well under many circumstances.

2.5   The Traumatic Stress Continuum

PTSD is one part of the broader spectrum called the "traumatic stress continuum". The impact of trauma is best conceptualized as a continuum starting at the moment of exposure to trauma (Time 0). From this point on, some people may be affected by trauma and display trauma-related symptoms, and some may not. For people who are displaying stress symptoms, if the symptoms do not recede, the progression is shown in Figure 2.
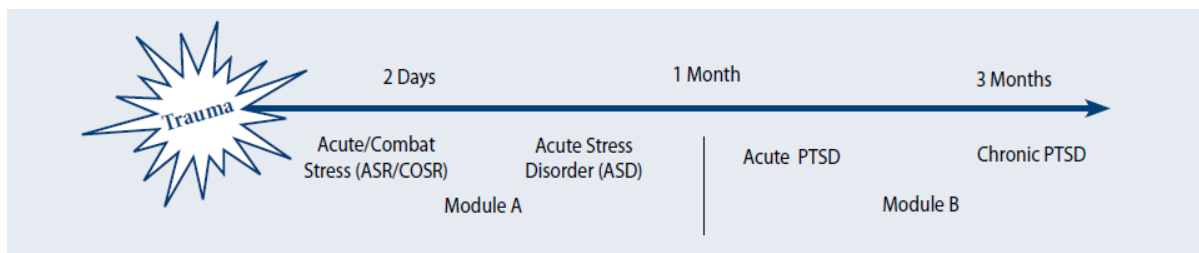
Figure 2: Continuum of Traumatic Stress (DoD, 2010, p. 15)

Progressive points on the traumatic stress continuum are as follows:

- Acute stress reaction (ASR) – This is not a formal DSM diagnosis, but involves trauma-related symptoms that happen around the trauma, minutes after and afterward, but typically disappear within about 2 days.
- Acute stress disorder (ASD) – Acute stress disorder was introduced in DSM IV. A diagnosis of acute stress disorder requires that symptoms last more than 2 days but less than 1 month. A diagnosis of ASD requires re-experiencing, avoidance and arousal and 3 of 5 dissociative symptoms (i.e., feeling detached or having no emotional response, being unaware of surroundings, de-realization (familiar surroundings or people feel strange), depersonalization (no longer feel like yourself, surroundings feel surreal), dissociative amnesia).
- PTSD can be diagnosed when an individual is still symptomatic more than 1 month after trauma with significant impact on functioning. PTSD is diagnosed as acute between 1 and 3 months after exposure, and is labelled as chronic when symptoms persist more than 3 months after exposure.[8]

It is clear from the literature that individual responses to traumatic stress vary widely, depending on the people involved and the types of trauma to which they are exposed. However, it is important to emphasize that displaying signs and symptoms of traumatic stress immediately after exposure (and even for up to a month after) is a natural response, and for most people, represents an adaptive way of dealing with the trauma.

2.6   Co-occurring Conditions

PTSD is not a condition that should be viewed in isolation, as it is significantly related to a range of other challenges. There are three primary categories of issue that often co-occur with PTSD: psychiatric, medical, and psychosocial. Societal factors are also discussed albeit less frequently in the literature. It is important that clinicians recognize these co-occurring conditions to ensure the most accurate prognosis and treatment for personnel affected by traumatic stress.

Psychiatric

According to DoD (2010), clinicians can expect to see other mental health disorders in up to 80 percent of their PTSD patients. Depression and substance abuseare the most common psychiatric disorders occurring in conjunction with PTSD (Yarvis & Schiess, 2008; Carter, Capone, & Eaton Short, 2011). Other mental health disorders that commonly arise with PTSD are panic disorder, obsessive-compulsive disorder, dysthymia, and generalized anxiety disorders (DoD, 2010).

DoD (2010) reports that up to 50 percent of veterans struggle with alcohol use disorder. Some researchers argue that increased alcohol use is due to PTSD sufferers attempting to self-medicate themselves (e.g., Robinson et al., 2009, Waldrop et al., 2007; both cited in Carter et al., 2011); Leeies et al., 2010 (cited in Carter et al., 2011) report that 20 percent of PTSD sufferers admit to using alcohol to treat their PTSD symptoms.

The comorbidity of PTSD and depression makes it difficult for clinicians to tease out one diagnosis from the other. A study by Fullerton, Ursano, and Wang (2004) found that rescue workers who screened positive for depression at seven months were up to 10x more likely to develop PTSD following a major traumatic event. Many studies examined for the current review show the link between depression and PTSD (e.g., Yarvis & Schiess, 2008; Elhai et al., 2011; Lande et al., 2011; Cukor et al., 2010; Richardson et al., 2011) and burnout (Lafauci Schutt & Marotta, 2011). In general, then, PTSD is often associated with a range of other psychiatric disorders.

Medical

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[8]As noted, the newer DSM-V definition of PTSD no longer makes the distinction between acute and chronic PTSD. Nonetheless, as the available literature still uses this frame, we also use it throughout this report.

PTSD patients "frequently report physical symptoms, cognitive health concerns, and utilize high levels of medical care services" (DoD, 2010, p. 81). Headaches, chronic physical pain and difficulty sleeping are the most commonly reported medical conditions associated with PTSD; others include cardiovascular disease, memory impairment, fatigue, hypertension, and dizziness (DoD, 2010; National Academies Press, 2012). Some researchers believe that PTSD-related medical issues are due to neuroendocrine dysregulation and reactivity in the nervous system (e.g., Hoge et al., 2007; Schnurr & Green, 2004; cited in DoD, 2010).

Unfortunately, it can be difficult to concurrently treat PTSD when medical problems prohibit certain treatment types (for example, if medications to treat cardiovascular disease cannot be mixed with PTSD medications). Therefore, clinicians often aim to treat the patient's medical condition prior to administering any PTSD treatments (DoD, 2010).

Psychosocial

PTSD sufferers show a range of problems with interpersonal relationships and therefore yield high divorce rates, sometimes struggle when raising children, and have histories of violence (Keane et al., 2006, DoD, 2010). Domestic violence in particular tends to co-occur with PTSD, especially in military populations (National Academies Press, 2012). A study from Teten et al. (2010; cited in National Academies Press, 2012) found that veterans with classic PTSD and sub-threshold PTSD both showed greater generalized aggression and hostility toward others than non-PTSD veterans, and this same observation was made male PTSD sufferers showing violence toward female partners (Jakupcak et al., 2007; cited in National Academies Press, 2012).

A case study examined in Carter et al. (2011) presents a PTSD patient who was once married but, due to heavy drinking and emotional numbness, eventually divorced and became estranged from his child, keeping social contact only with his parents and siblings on rare occasions. This type of detachment from others is common in PTSD sufferers. Some of the problematic psychosocial behaviours sometimes associated with PTSD can be very harmful to the sufferers' social relationships.

Societal

PTSD patients often find themselves in trouble with the law given that they often engage in risky behaviour, such as dangerous driving and substance abuse (Keane et al., 2006). They also tend to have a difficult time staying employed and yield high rates of homelessness. Furthermore, PTSD is associated with lower quality of life (Marshall et al., 2001, Resnick & Rosenheck, 2008). Perhaps most troubling, personnel with PTSD are also noted in the literature as being at a higher risk for suicide (Guerra & Calhoun, 2011), and this risk is further emphasized when PTSD co-occurs with alcohol use disorder (Leeies et al., 2010, cited in Carter et al., 2011).

Importantly, even within the first responder community, PTSD is also noted to be associated with problems such as depression, somatic complaints, chronic fatigue and alcohol dependencies (Haugen et al., 2012).

Given the many different challenges that personnel with PTSD are likely to face, then, the need for them to receive timely and effective treatment and support is even more critical.

2.7   Chapter 2 – Take Home Messages

The research reviewed in this section shows a number of "take home" messages relevant to the emergency responder community as it works to manage the traumatic stress faced by their personnel.

2.7.1   Definitions of PTSD

To better manage a problem like PTSD, the first responder/receiver community must have a clear, common sense and intuitive way to understand PTSD, so that they can begin to transmit this understanding to their personnel.

In the literature, PTSD is defined as a condition where symptoms evolve in the aftermath of an extreme traumatic stressor that overwhelms the individual's coping capacities. PTSD is only diagnosed at least 30 days after traumatic exposure and can only be accurately diagnosed by trained professionals.

A particularly important part of the definition to be emphasized is that showing stress-related symptoms after exposure to traumatic stressors is normal, expected and not a sign of weakness of character or constitution. In fact, failing to show signs of stress after traumatic exposure could be a warning sign that they may be cutting themselves off from the emotion associated with the trauma that they have experienced.

2.7.2   Managing PTSD is critical

As this chapter shows, PTSD is a serious and potentially debilitating illness that is linked with many other conditions and challenges (e.g., risk of suicide). This suggests that deliberate efforts to manage all forms of traumatic stress are critical, particularly for organizations that require their personnel to be exposed to traumatic situations.

2.7.3   First responders and first receivers are both susceptible to PTSD

An important part of promoting increased recognition of PTSD is ensuring more awareness of indirect or second hand or trauma. By virtue of the work that they do, first responders and receivers are exposed to both direct and indirect trauma. First receivers such as physicians and nurses, for example, are sometimes quite detached from the actual situation in which traumatic injuries occur. This should not be interpreted, however, as them not having to manage the stresses of even indirect exposure.

2.7.4   Symptoms of PTSD

Understanding the symptoms of PTSD is critical to helping personnel get the support that they require. The symptoms of PTSD are well understood and described in the literature as:

- Re-experiencing traumatic events – recurring distressing thoughts that can include intrusive memories, nightmares, flashbacks, heightened emotional/physical reactions
- Avoidance, emotional numbing – trying to avoid or not discuss a traumatic event, excessive rumination, loss of interest, less interest in activities and detachment from people
- Hyper-arousal (e.g., unusual agitation, sleep disturbance, irritability or anger, hyper-vigilance, problems concentrating, exaggerated startle response).

At the same time, as it is critical to watch for the obvious stress-related symptoms, it will also be critical to consider related challenges personnel experience that might mask trauma-related stress (e.g., substance abuse or depression).

2.7.5   PTSD is not all-or-nothing

A person can be showing some of the symptoms of PTSD without meeting the full clinical PTSD profile. The implication of this is that even personnel who are showing some symptoms may be functioning in a substandard way, and may require assistance to keep from progressing to "full-blown" PTSD. Given this, it is important to consider the entire stress continuum when thinking about helping personnel who are at risk of PTSD.

2.7.6 The onset of PTSD can be delayed

Delayed onset PTSD is defined as emerging more than 6 months after the initial trauma. The implication of this is that personnel may develop PTSD months later even though they initially show no signs soon after exposure. This suggests that it is critical to monitor even personnel who are not showing signs of PTSD but who may be showing some symptoms of traumatic stress. At an organizational level, this indicates that the full impact of exposure to trauma cannot necessary be known even in the months immediately following a traumatic event.

2.7.7 Some traumas are more likely to lead to PTSD

The available literature suggests that the type of trauma to which personnel are exposed influences the potential for the development of PTSD. For example, there is good evidence that traumatic stress is more likely to occur if trauma is human-induced. This would suggest that it might be helpful to track the nature of the trauma to which first responders/receivers have been exposed to assess their risk of developing traumatic stress related injuries.

2.7.8 Risk factors for developing PTSD

A range of factors that put people at higher risk for developing PTSD are noted in the literature. These are factors that exist before trauma (e.g., life stress, low social support, psychiatric problems or history of PTSD, poor training or preparation), that are linked with trauma (e.g., physical injury sustained, severe traumas, high perceived threat), and exist after the trauma (e.g., ongoing life stress, poor coping, poor social support). Personnel who perform in high-risk occupations should ideally be screened for these risk factors.

2.7.9 PTSD is a prevalent problem for people exposed to traumatic stress

Estimates are that about 10% of the general population will develop PTSD in their lifetime, and these rates are much higher for military personnel in combat (as high as 30%) and for emergency responders. For emergency responders to 9/11, estimates of PTSD rates vary between 5.9% affected to more than 22% affected, with a prominent estimate across all emergency responders at 17.7% (Haugen et al., 2012)

2.7.10 PTSD treatments will not always be effective

Even though many PTSD treatments have been shown to be somewhat effective, many people will continue to show PTSD symptoms even with treatment. Epidemiological research shows that about 33% of people with acute PTSD show trauma-related symptoms for 6 years or longer;

2.7.11 It is important to understand conditions that co-occur with PTSD (e.g., alcohol abuse)

People who have PTSD also often experience a range of other challenges and these can mask PTSD. These include psychiatric challenges (e.g., increased suicide risk, depression, substance abuse), medical (e.g., more common somatic complaints, headaches and chronic pain), and psychosocial (e.g., domestic violence, involvement with the legal system, divorce, etc.).

2.7.12 People generally have a high natural resistance to PTSD

Even people showing stress-related symptoms spontaneously recover even without assistance and only a small subset will develop PTSD. For the emergency responder community, the key may be to capitalize on this natural resistance and to strengthen it to the highest possible degree.

3. Prevention of PTSD[9]

This chapter explores the prevention of PTSD both before and after exposure to traumatic events. Efforts to prevent PTSD can focus on protecting people before exposure (i.e., in the absence of trauma) or working with them after exposure to decrease the severity of their symptoms and to limit their progression on the traumatic stress continuum (e.g., from acute stress reaction, to acute stress disorder to PTSD). Some researchers have argued that working to prevent PTSD (Feldner et al., 2007) has received less attention than treating it once it occurs. There are different types of prevention, as follows:

- Universal intervention – targeting all personnel, regardless of risk
- Selective intervention – targeting only at-risk personnel
- Indicated intervention – targeting only people showing start of symptoms

As Feldner et al. (2007) have argued, most prevention efforts have targeted only at-risk personnel (that is, selective intervention). Particularly when resources are limited, focusing on a broad range of personnel (even in the absence of a concern) may be seen to be less effective than targeting personnel who are experiencing problems with traumatic stress.

The literature suggests the importance of prevention, particularly for personnel likely to be exposed to traumatic stress. For example, a key recommendation of DoD (2010a, p. 14) guidelines is as follows:

> *"In high-risk occupations, for which the probability of trauma exposure is moderate or high, efforts should be undertaken to increase the psychological resilience of workers to the negative effects of traumatic exposure."*

The remainder of this chapter explores the specific nature of these preventative efforts, including the role of education and training, attention to personality characteristics and screening efforts, all of which are intended to decrease the impact of exposure to traumatic stress.

3.1 Education and Training Programs

Using education and training proactively (i.e., to lessen the negative impacts of traumatic stress once people are actually exposed to trauma) is noted at multiple points throughout the available literature.

There has been considerable interest and effort in establishing programs intended to protect personnel from the dangers of traumatic stress and our review suggests that U.S. military systems offer some of the most best developed approaches and best practice guidelines (e.g., DoD, 2010). The remainder of this section provides quick overviews of some relevant programs that attempt to lower the impact of traumatic stress on military personnel if they are exposed to traumatic stressors.

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[9]Prevention efforts are defined as occurring either before traumatic events occur, or within the first 30 days after exposure to trauma. For the purposes of this review, we have chosen to address any treatment of PTSD (whether occurring within the first 30 days) or after 30 days in Chapter 5, which follows.

3.1.1 Sample Education/Training Programs

3.1.1.1 Canadian Forces - Road to Mental Readiness

Within the Canadian military system, the Road to Mental Readiness (R2MR) describes the training provided throughout a member's career to encourage resilience and mental health (Department of National Defence; DND, 2010). Across the deployment cycle, R2MR training is geared toward providing CF personnel with the information and skills needed to identify and cope with the stresses one is likely to encounter in a deployment setting. This training begins in pre-deployment where soldiers are provided with an understanding of the stressors associated with deployment, the physical reactions associated with stress in a military context, strategies for dealing effectively with the physiological arousal associated with stress (e.g., tactical breathing), as well as sources of help during deployment including beliefs and values, friends and family, leadership and mental health professionals. This training is also extended to the family of deploying soldiers to allow them to support not just the deploying soldier, but to understand the stresses that they may themselves encounter while their family member is deployed. The R2MR training extends beyond pre-deployment readiness and emphasizes post-deployment reintegration after deployment. Again, this training is provided not only to the CF member, but also to their families.

The CF R2MR program explains stress-related concerns in terms of the Mental Health Continuum Model (MHCM). The MHCM recognizes a spectrum of concerns and indicates that movement can happen in both directions along the continuum and, "…that there is always the possibility of a return to full health and functioning" (DND, 2010, p. 5). Both deploying CF members and their leadership are trained to observe and recognize the signs and symptoms associated with the various stages along the MHCM as well as the relevant coping strategies within each stage, as shown in Figure 3.
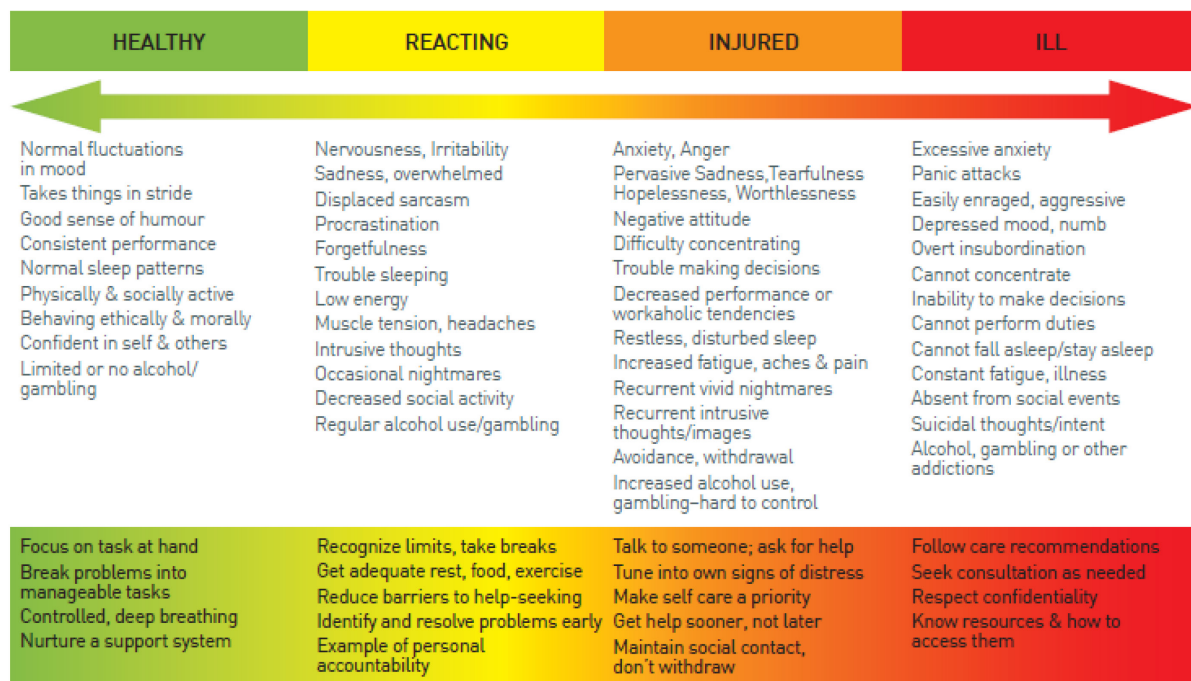
**Figure 3: Mental Health Continuum Model (DND, 2010, p.5*)*

To mitigate the impact of stress, the R2MR trains CF members to employ countermeasures to manage stress, both mentally and physically. This training emphasizes four strategies: goal setting, mental rehearsal/visualization, self-talk, and arousal reduction, as shown in Figure 4.

GOAL SETTING	VISUALIZATION	SELF-TALK	AROUSAL CONTROL
Specific: your behaviour **M**easurable: see progress **A**ttainable: challenging & realistic **R**elevant: want it or need it **T**ime-bound: set finish line Break it down into small manageable pieces	Be calm and relaxed Use all senses See positive mental images Keep it simple Use movement Rehearse it first to improve performance	Become aware of self-talk Stop the negative messages Replace with positive Practice thought stopping "I can do this." "I am trained and ready." "I will focus on what I *can* do."	Tactical Breathing: Rule of 4 Inhale to count of 4 Exhale for count of 4 Practice for 4 minutes Breathe into the diaphragm.

**Figure 4: The Big 4 Mental Health Continuum Model (DND, 2010, p.5*)*

Finally, the R2MR training provides CF leaders with instructions on how to best review a stress-provoking incident and how to address the incident effectively in order to mitigate the negative reactions to it. Specifically, they promote a three-step process termed the Ad Hoc incident review (AIR). The first step, acknowledge, calls for recognition of the incident (e.g., "Something bad just happened"), but encourages a calm, straight forward, and clear discussion of the event without an over-emphasis on it. This step allows for the discussion of the incident, but while refraining from forcing individuals to speak about an event that they are not ready to talk about. This, they argue, may interfere with one's natural coping strategies. Step two, inform, calls upon leaders to check in on their troops and to apply the MHCM and be aware of signs and symptoms that may indicate that an individual is having difficulty coping with an event. The final step, respond, entails observing one's troops and following up to ascertain whether individuals are recovering normally from the stressful situation or whether signs may point to the need for further care from a mental health practitioner, chaplain, etc.

The R2MR, therefore, provides information to CF personnel and leaders on the normal reactions to stressful events (both mental and physical) and encourages healthy coping with stress. It also identifies observable signs and symptoms of distress that, if identified early, are key to recovery.

3.1.1.2 U.S. Army - Comprehensive Soldier Fitness

A good example of this trend is the Comprehensive Soldier Fitness (CSF) Program offered by the U.S. Army (Cornum, 2009). In late 2009, the U.S. Army rolled out an aggressive long-term assessment and development initiative aimed at enhancing resiliency, coping skills, and readiness, as well as increasing the performance of Army personnel and their families. As part of the Army's broader "Ready and Resilient Campaign", the CSF2 program targets 5 key areas of resilience, as follows:

- Physical factors, for activities that require aerobic fitness, endurance, strength, healthy body composition and flexibility derived through exercise, nutrition and training;
- Emotional factors, to approach life's challenges in a positive, optimistic way by demonstrating self-control, stamina and good character with choices and actions;
- Social factors, to develop and maintain trusted, valued relationships and friendships that are personally fulfilling and foster good communication including a comfortable exchange of ideas, views and experiences;
- Spiritual factors, to strengthen a set of beliefs, principles or values that sustain a person beyond family, institutional and societal sources of strength, and;
- Family factors, to be part of a family unit that is safe, supportive, and loving and provides the resources needed for all members to live in a healthy and secure environment

The program begins by providing individual assessment across four of the factors (emotional, social, spiritual, and family) using The Global Assessment Tool (GAT), which provides a baseline measure to track self-development and growth throughout their service career. Based on GAT performance, online self-development training modules are tailored to support individual developmental needs. At the institutional level, training is taught in Training and Doctrine Command schools, and linked to the unit deployment cycle. Further, systematic support is provided by Master Resilience Trainers, who teach leaders how to continuously instill resilience in subordinates. Overall, the CSF is a program designed to develop soldiers' knowledge, skills, and attitudes, enabling them to overcome challenges, mature, and bounce back from adversity (Cornum, 2009) as shown in Figure 5.
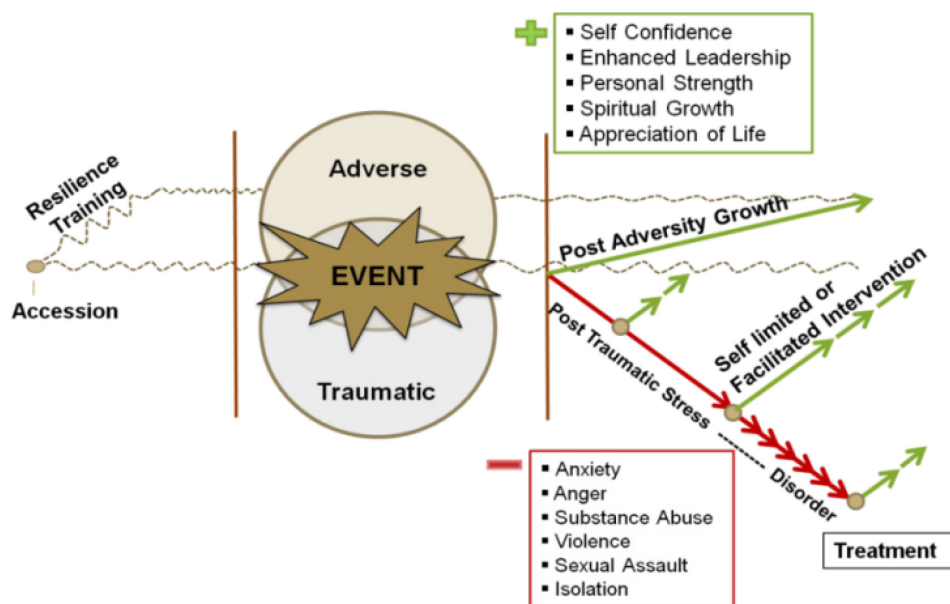
Figure 5: Comprehensive Soldier Fitness Model of Adversity Response (Cornum, 2009)

The most significant component of the program is resiliency training, based on the principles of positive psychology and the work of Dr. Martin Seligman, a prominent psychologist. According to Seligman, the response to strong adversity or trauma (e.g., the stresses encountered during combat) is bell shaped. At the extreme end is post-traumatic stress disorder, in the middle is ordinary resilience, and at the positive end is post-traumatic growth (Novotney, 2009). One of the central components of this training is to teach soldiers how to identify and avoid catastrophic thinking; to see challenges as temporary (not permanent), local (not global), and changeable through their own effort (rather than feeling like a helpless victim). Soldiers are also taught how to use their personal strengths to build better relationships and learn the importance of constructive responding, by expressing sincere enthusiasm and interest with friends or partners (Novotney, 2009). Seligman expects that resilience training, as part of the CSF program, will shift the adversity response curve to the right, and reduce the proportion of soldiers suffering from Post-Traumatic Stress Disorder (PTSD) and increasing the probability of experiencing post-adversity growth.

3.1.1.3 Other

As noted in a 2012 report from the Institute of Medicine, somewhat similar programs exist in other elements of the U.S. military system, including the Total Force Resiliency Program of the Air Force, the Navy's Combat and Operational Stress Continuum Program and a Marine Corps program entitled Operational Stress Control and Readiness (OSCAR).

Research within the policing domain is also shows concerns for mental readiness as a way of managing stress. An extensive study explored the key components of mental readiness within the Ottawa Police

Force, with a view to identifying the critical influences on mental readiness, as well as the factors that might detract from readiness. McDonald (2006) had highly respected police officers (n=47) complete questionnaires and participated in interviews assessing mental readiness and performance. Results showed that these experts rated mental readiness as more crucial to performance than physical and technical readiness. In other words, without mental readiness, police officers argued that they were more at risk for poor performance. Analyses of these interviews also confirmed the importance of several "success elements" noted in previous research (Orlick, 1989; 1992; 2002; as cited in McDonald, 2006).These 7 success elements were shown to be several readiness dimensions, as shown in Figure 6.

Figure 6: Orlick's "Model of Excellence" (McDonald, 2006)

Although this model does not emphasize PTSD specifically, it does show mental readiness as a critical part of maintaining one's performance even when facing highly stressful situations.

3.1.2   Building Resilience/Hardiness/Toughness

These education and training programs aim to promote the ability to cope with traumatic stress. An issue that has received considerable attention within the traumatic stress literature is whether it is possible to select (or train) particular types of people for high risk roles (e.g., military or first responders) whose "makeup" or personality will make them particularly adept at managing the stresses that they will face. Although many possible constructs are relevant to this ability, resilience/readiness, hardiness, and mental toughness emerged most frequently in the available literature.

Resilience/Readiness – The terms "resilience" and "readiness" are often linked in the military literature. A Canadian Forces document has defined resilience as "the capacity of a solider to recover quickly, resist, and possibly even thrive in the face of direct/indirect traumatic events and adverse situations in garrison, training and operational environments" (CF Mental Readiness, p. 2). Other research undertaken for the CF has emphasized the construct of personal readiness and resilience (Adams, Hall & Thomson, 2009).

In general, there is some evidence that people who are more resilient will be better able to manage in high stress environments, and considerable research is being done within military systems and in other workplaces. However, this body of research remains relatively new, and there is currently little consistency in the definition of the resilience construct or agreement about how best to measure it.

Hardiness - The characteristic of "hardiness" is typically defined as the ability to thrive under pressure (e.g., Moran & Colless, 1995; cited in Haugen et al., 2013). Hardiness has been conceptualized as the arrangement of personality characteristics that act as a buffer during stressful life events (Kobasa, 1979; Kobasa, Maddi, & Kahn, 1982). Based on her research, Kobasa (1979) proposed that hardiness contained three distinct components, namely commitment, control and challenge. Hardy individuals are thought to have "a high sense of life and work commitment, a greater feeling of control, and are more open to change and challenges in life. Hardy individuals tend to interpret stressful and painful experiences as a normal aspect of existence, part of life that is overall interesting and worthwhile" (Bartone, 2006, p. 137). Hardiness has been shown to reduce the occurrence of illness in reaction to stress and is linked to the ability to thrive under pressure in both one's personal and professional life. Military research has shown hardiness to be a predictor of stress tolerance, the ability to perform in a highly demanding military setting (Bartone, 1999; Bartone, 2006; Bartone, Roland, Picano, & Williams, 2008) and to offer some protection against the ill effects of stress.

Mental Toughness - A personality construct entitled mental toughness has received attention recently from researchers working in domains such as sport, occupation, and the military due to its influence on performance and success (Marchant, Polman, Clough, Jackson, Levy, & Nicholls, 2009). Unfortunately, despite a growing literature on the topic, there has been difficulty in obtaining consensus among researchers regarding its definition, conceptual framework, and measurement (Crust, 2007; Middleton, Marsh, Martin, Richards, & Perry, 2004). A definition emerging from a Canadian Forces document defines mental toughness as "..the ability to bring to life whatever skills and talents you have – on demand. This could involve one's ability to fight sleepiness, or to stay relaxed and calm or to not surrender your spirit when the odds are against you (Loehr, 2009; cited in CF Mental Readiness, p. 2).Interestingly, the similarities between hardiness and mental toughness are considerable, to the point that previous researchers have classified hardiness as a sub-component of mental toughness (Fourie & Potgieter 2001; cited in Crust, 2007). Common to both constructs are the qualities of resiliency, perseverance, strong coping strategies, achievement motivation (predominantly intrinsic), and an unyielding sense of purpose (Crust, 2007).

From this point of view, then, there is some agreement in the literature that selection or training could be used to increase the hardiness, resilience and toughness of personnel who will be exposed to traumatic stress.

3.1.3 Overview of Education and Training

These preventative education and training programs and approaches, then, represent a potentially important way to attempt to protect personnel from the negative effects of PTSD. There is some evidence in the available literature that high levels of preparedness in military personnel are related to lower rates

of PTSD (Renshaw, 2011). Although constructs such as resilience and hardiness offer the promise that it might be easy to determine the kinds of people who are likely to be most adept at handling traumatic stress and to then strategically select these people when hiring for high risk jobs (e.g., first responders and receivers), the available literature shows that this promise is yet to be fully realized. One of the problems is that the relevant constructs are not always uniquely defined, and even when they are, valid and reliable measures of the core construct remain somewhat lacking. However, considerable effort is being exerted to more accurately gauge the protective factors that might help personnel working in high risk environments to better manage stress.

Assessing the more global effectiveness of education and training is also currently problematic, as the required research has simply not been done (IOM, 2012). The same conclusion was reached within the DoD (2010) report. However, as both reports acknowledged, even though the education and training approaches have yet to be extensively proven, the basic principles underlying the approaches used have often been shown to be effective for managing stress in a broad range of contexts. For example, there is good evidence that helping people adapt better coping strategies can help them manage stress better (e.g., Carver & Connor-Smith, 2010). However, whether these coping strategies actually lower PTSD risk or not seems unestablished on the basis of the available literature.

Despite the current lack of strong evidence, however, the argument seems to be that low-cost education and training (even if currently not wholly proven) is a logical way to mitigate the negative effects of traumatic stress that will likely "pay off" as the strong body of (hopefully supportive) research continues to develop.

Recommendations for how to design training and education related to managing traumatic stress is provided in DoD guidelines (2010, adapted from p. 16) as follows:

Table 7:Preventative Education and Training (DoD, 2010, adapted from p. 16)

Recommendation	Explanation/Detail
Promote realism in training, with "vicarious, simulated or actual exposure to traumatic stimuli"	Simulating highly stressful exposure to trauma has been shown in approaches like stress inoculation
Emphasize coping skills (e.g., cognitive restructuring, problem-solving)	This could include using positive role models and leaders who demonstrative adaptive coping styles
Promote highly cohesive working environments	Peer support and strong leadership are critical to managing in high stress environments
Promote adaptive beliefs about one's work role and probable traumatic stressors	This includes realistic expectations about oneself, as well as about leaderships, the nature of acute stress reactions, negative beliefs that can arise in work situations
Tailor stress-management programs to specific workplaces	Different personnel will encounter different forms of stress, so personnel need to have tailored approaches. They also need about the importance of dealing with traumatic symptoms rather than hiding them or trying to manage alone.
Educate about the traumatic stress continuum and other related behaviours (e.g., interpersonal problems, work issues, alcohol and substance abuse).	Understanding the traumatic stress continuum will help both people exposed to traumatic stress recognize their status, but also help them support their peers
Educate with positive messages about coping, provide simple strategies and encourage mastery/recovery	Personnel need to know that managing traumatic stress is possible

The assumption of these education and training approaches, then, is that preparing personnel likely to be exposed to traumatic stress will help to strengthen their natural coping mechanisms.

3.2   Screening for Traumatic Stress Symptoms

Particularly in high risk occupations, the available literature emphasizes the importance of regular screening for personnel who have been exposed or who are likely to be exposed to traumatic stress. As the DoD best practice report argues:

> *"In terms of screening, evidence suggests that identifying PTSD early and quickly referring people to treatment can shorten their suffering and lessen the severity of their functional impairment." (DoD, 2010, p. 5)*

Within the U.S. military, DoD Practice Guidelines require yearly screening or more frequently for personnel who have been exposed to major trauma or who have a history of PTSD, using either questionnaires or computer-based tools. This pro-active screening is based on the assumption that quick identification and access to treatment will lessen the distress and probability of progression to PTSD, and lower the potential for negative work and quality of life impacts.

DoD Practice Guidelines require assessments of the following dimensions of trauma:

- Type of trauma – as noted earlier, some traumas are more problematic than others
- Frequency – including time since exposure
- Nature- distress level, functional impairment
- Severity – e.g., brief or prolonged exposure

Importantly, their guidelines stipulate that assessments should include the "index" (or known) trauma as well as other possible traumas that the target might have experienced. Even if personnel have been

exposed to a clear and known trauma, then, they may have experienced other traumas to which only they have access.

3.2.1 Screening Process

In accordance with the definition and symptoms of PTSD, screening should target the same symptoms clusters prominent throughout the available research (DoD, 2010, p. 21), as shown in Table 8.

Table 8: Symptom Clusters for PTSD Screening (DoD, 2010, p. 21)

Re-experiencing	Avoidance/emotional numbing	Increased arousal
Intrusive memories, images or perceptions Flashbacks Nightmares Exaggerated emotional and physical reactions	Avoids activity Loss of interest Detached Restricted emotion	Difficulty sleeping Irritability or increased outbursts of anger Difficulty concentrating Hyper-vigilance Exaggerated startle response

As noted earlier, however, one of the challenges with detecting acute stress reactions is that trauma-related symptoms are sometimes "masked". For example, depression is commonly associated with PTSD, as is alcohol abuse (Carter, Capone & Eaton Short, 2011; Fullerton, Ursano & Wang, 2004). This suggests that in addition to the symptoms typically associated with traumatic stress (shown in Table 8), it is also important to consider a broader range of physical, emotional and behavioural symptoms, as shown in Table 9.

Table 9: Other Symptoms to Screen For (DoD, 2010, p. 21)

Type of response	Examples
Physical	Exhaustion, hyper-arousal, somatic complaints
Emotional	Anxiety, depression, helplessness
Behavioural	Avoidance, alcohol or drug use, changes in productivity at work or functioning in general

3.2.2 Screening Tools

There are many screening tools available to investigate one's risk for PTSD. Screening is a preliminary step meant to precede diagnosis and determines whether or not an individual is at risk for the disorder. Although there is reported to be no conclusive evidence (DoD, 2010) arguing in favour of one screening tool over another, a number of validated screening tools are available. The screening tools most commonly noted in the available literature are identified first, followed by some of the less common tools.

3.2.2.1 Primary Care PTSD Screen (PC-PTSD)

The Primary Care PTSD Screen (Prins et al., 2003) is reported as the most common screening tool (National Academies Press, 2012). A study from Calhoun, McDonald, Guerra, Eggleston, Beckham, and Straits-Troster (2010) reports that the PC-PTSD is used in more than 731 outpatient care clinics, as well as in 153 Veteran Affairs medical centres. The symptom-focused screen (as opposed to trauma-focused) is composed of 4-items requiring Yes/No responses. According to the Department of Veteran Affairs (2002), a positive response on the screen does not indicate PTSD but suggests that further assessment is needed. The creators of the scale (Prins et al., 2003) have presented evidence of acceptable test-retest reliability. Validity of the scale has been supported by several studies; however, several of these studies were not scientifically, strong so additional validation tests are required (Calhoun et al., 2010).

The PC-PTSD (Prins et al.) asks participants, "In your life, have you ever had any experience that was so frightening, horrible, or upsetting that, in the past month, you:

- Have had nightmares about it or thought about it when you did not want to? Yes/No
- Tried hard not to think about it or went out of your way to avoid situations that reminded you of it? Yes/No
- Were constantly on guard, watchful, or easily startled? Yes/No
- Felt numb or detached from others, activities, or your surroundings? Yes/No

If the participant responds "yes" to three or more items, they are defined as having screened positive for PTSD risk.

3.2.2.2 Impact of Events Scale – Revised (IES-R)

Another common screening tool is the Impact of Events Scale – Revised (IES-R; Weiss & Marmar, 1997). The IES-R is composed of 22 self-report items addressing symptoms of hyper-arousal, avoidance, and intrusive thoughts. The IES-R has been found to correlate with other PTSD measures, such as the SPAN (Metzler-Brody et al., 1999) and the PTSD Checklist (Creamer et al., 2003), and there is strong support for its reliability and validity (see Beck et al., 2008; Christianson & Marren, 2013). There is also evidence of this scale having been used with first responders such as police officers (e.g., Chopko & Schwartz, 2013) and firefighters (e.g., Bryant & Harvey, 1996). Some studies use the IES-R as a diagnostic tool, but the majority of clinicians and researchers use it only for preliminary screening assessment (Department of Veterans Affairs, 2013).

The IES-R asks participants to indicate how distressing each of the 22-items listed has been in the past seven days. The scale goes from 0 ("Not at all") to 4 ("Extremely"). Example items are:

- I had trouble staying asleep.
- I felt irritable and angry.
- I tried to remove it from my memory.
- I had trouble concentrating.
- Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.

There is no specific cut-off score for a positive PTSD screen on the IES-R.

3.2.2.3 PTSD Brief Screen

The PTSD Brief Screen (Leskin & Westrup, 1999) is a 4-item scale created specifically for the U.S. Department of Defence. It is most commonly used in military populations and is recommended in the VA/DoD Practice Guideline for the Management of Post-Traumatic Stress (DoD, 2010). The PTSD Brief Screen is validated across many studies, but the current review did not find any evidence supporting its use with first responders specifically.

The PTSD Brief Screen asks participants, "In your life, have you ever had an experience that was so frightening, horrible or upsetting, that, in the past month, you…

- Kept thinking about the event? Yes/No
- Tried hard not to think about it? Yes/No
- Became upset when people, places, or things reminded you of the event? Yes/No
- Tried to avoid anything that reminded you of the event? Yes/No"

If the participant responds "yes" to two or more items, they are considered positive for PTSD risk. This scale was obtained from Department of Veterans Affairs (2002.)

3.2.2.4 SPAN

The SPAN (Meltzer-Brody, Churchill, & Davidson, 1999) is named after the primary symptoms of PTSD (i.e.,Startle, Physiological arousal, Anger, and Numbness). It is a 4-item self-report screening instrument that is often administered along with the Davidson Trauma Scale (Davidson, Book, Coolket, Tupler, Roth, David et al., 1997). Calhoun et al. (2010) report that the SPAN is a reliable and valid tool that performs better than the PC-PTSD Screen due to its Likert-type scale setup. Compared to the dichotomous PC-PTSD, the SPAN allows for more differentiation between individuals' responses and thus better identification of the severity of symptoms. The limitation to the SPAN is that it is not publicly available and comes at a cost, so sample items are not available.

The specific characteristics of these prominent screening tools are shown in Table 10.

Table 10: Prominent screening tools for PTSD

Measure	# of Items	Type/ Time	Reliability/ Validity Evidence	Additional Notes	Feasibility for First Responders
Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003)*	4	Self-Report	Medium to High/ Medium to High	Most common screening tool (National Academies Press, 2012).	✓
Impact of Event Scale – Revised (IES-R; Weiss & Marmar, 1997)*	22	Self-Report	High/High	Original 15-item IES (Horowitz et al., 1979) excluded hyper-arousal. Adaptations available in many languages.	✓
PTSD Brief Screen (Leskin & Westrup, 1999)*	4	Self-Report	High/Medium to High	Recommended by the VA/DoD Clinical Practice Guidelines (2010); Leskin & Westrup (1999) created for DoD.	?
Startle, Physiological arousal, Anger, and Numbness Instrument (SPAN; Meltzer-Brody et al., 1999)	4	Self-Report	High/Medium to High	A brief PTSD screening tool derived from the DTS.	✓
*Full scale obtained and available.					

In addition to these prominent screening tools, some other less commonly used scales were also noted in the literature.

3.2.2.5 Short Screening Scale for DSM-IV PTSD

Much like the PTSD Brief Screen, the Short Screening Scale for DSM-IV PTSD (Breslau et al., 1999) is recommended in the VA/DoD guidelines for PTSD (Department of Veteran Affairs, 2004). It is comprised of 7 items assessing PTSD symptoms. Relatively recently, this scale was tested with a large non-military sample and results showed it to be sensitive, reliable, and valid (Bonhert &Breslau, 2011). Thus, there is reason to test how well this screening procedure works among first responders in future research.

For the 7 Short Screening Scale for DSM-IV PTSD items, participants are asked to respond "yes" or "no". The items include:

- Did you avoid being reminded of this experience by staying away from certain places, people, or activities?
- Did you begin to feel more isolated or distant from other people?
- Did you find it hard to have love and affection for other people?
- Did you begin to feel that there was no point in planning for the future?
- Did you become jumpy or get easily startled by ordinary noise or movements?

According to Bonhert and Breslau (2011), a cut-off value of 4 appears to be most appropriate for predicting onset of PTSD.

3.2.2.6 Trauma Screening Questionnaire (TSQ)

The Trauma Screening Questionnaire (TSQ; Brewin et al., 2002) investigates PTSD symptoms experienced at least twice within the last week. The TSQ derives from the PTSD Symptom Scale (Self-Report version; PSS-SR; Foa et al., 1993). Walters and colleagues (2007) established that the TSQ is effective in predicting onset of PTSD. The National Center for PTSD (2013) lists the TSQ as a primary screening instrument, along with the PC-PTSD and the SPAN. Although the TSQ is not specific to any particular population, it has yet to be validated among first responder samples.

On the TSQ, participants are asked to respond "Yes", "No", or "I don't know" to each of the 10 questions. Some example questions include:

- Have you ever been involved in a major accident or disaster?
- Have you ever been physically assaulted or been a victim of violent crime?
- Have you ever received uninvited and unwanted sexual attention (e.g., touching or cornering, pressure for sexual favours, verbal remarks)? Did this happen while you were in the military? (Two-part question; participants answers each separately.)
- Would you like to talk to a mental health worker about any of the above problems?

Cut-off scores for positive PTSD risk can be anywhere from 3 to 7.

There other available screening tools are shown in Table 11.

Table 11: Other screening tools for PTSD

Measure	# of Items	Type/ Time	Reliability/ Validity Evidence	Additional Notes	Feasibility for First Responders
Short Screening Scale for DSM-IV PTSD (Breslau et al., 1999) *	7	Self-Report	High/High	Quick screening procedure supported by various studies (e.g., Kimerling et al., 2006).	?
Trauma Screening Questionnaire (TSQ; Brewin et al., 2002)*	10	Self-Report	Medium to High/Medium	Adapted from Foa et al.'s 1993 PSS-SR. Validation discussed in Walters et al., 2007.	?
*Full scale obtained and available.					

Information about actual screening procedures used within the U.S. military system was noted in the available research. Within the DoD, the 4-item PC-PTSD is contained within the post-deployment health assessment (PDHA), and these scales are given immediately upon the completion of a deployment and again 3-6 months after deployment as part of the post-deployment health assessment reassessment (PTHARA). These health scales already require a trained health care provider to review responses, and the PCL also requires interpretation by qualified and trained personnel. Within Veterans Affairs, screening is done every year for the first 5 years after exposure to trauma and every 5 years after.

It is important to note that although there are tools available for screening specifically, PTSD diagnostic tools are also used to screen patients. The advantage using screening tool over a full diagnostic measure is time. Most PTSD screening tools, as shown in Table 10, contain only a few items and take under 15 minutes.

Personnel who show trauma-related symptoms during screening then need to be assessed in a more detailed way by professionals. This suggests that to be effective, screening programs need to be paired with organizational systems that actually provide follow-up when screening identifies personnel with potential problems. Detecting that a first responder is suffering from PTSD is important, but less

meaningful if the organization does not then have the ability to either to continue to monitor further or to initiate the appropriate treatment.

3.3 Chapter 3 – Take Home Messages

The information reviewed in this section has the following implications for first responders/receivers.

3.3.1 Work proactively to address traumatic stress and prevent PTSD

As this chapter suggests, then, the available literature emphasizes the importance of a proactive approach to preventing PTSD. Unfortunately, although prevention is argued to be important, the evidence showing the true impact of prevention is not very well developed. As such, there is no clear and easy way to prevent the negative impacts of traumatic stress evident in the literature. However, the assumption seems to be that even if research cannot yet show the positive effects of prevention, it is still worthwhile to prepare personnel, particularly though in high-risk occupations.

3.3.2 Initiate preventative education and training programs

Preventative education and training for preparing personnel in high risk environments need to have a number of features. First, it needs to be realistic – lowering the impact of traumatic stress requires putting personnel in as many stressful, work-related situations as possible. This, of course, is the logic behind the high use of simulated disaster scenarios and simulations that are used in emergency responder training programs. Second, personnel need to use these opportunities to learn how to cope with high levels of stress, to solve problems rather than be overwhelmed by them and by working to structure their thinking to minimize the potential impact of traumatic stress. For example, in highly horrific situations, first responders might temporarily need to depersonalize the victims that confront them to allow them to do what they need to do rather than being overwhelmed by the situation. The literature reviewed in this section also emphasizes the important role of cohesive working environments as a potential buffer when faced with traumatic stress. Simply put, feeling strongly supported by one's peers is a critical requirement for emergency responders, as many high stress situations require a coordinated approach. At the same time, however, the available literature also emphasizes that education and training related to traumatic stress also needs to be tailored to the unique nature of the workplace. The stresses faced by paramedics vs. police officers vs. nurses are uniquely their own. Hence, a "one-size-fits-all" approach to training will not be maximally effective. One commonality is that the training needs to educate about the nature of traumatic stress, to inform them about the full continuum and to ensure that they are able to recognize the symptoms of traumatic stress in both themselves and in their teammates.

3.3.3 Regular screening for trauma is critical

The available literature is clear on the need for regular and proactive screening of personnel, whether or not they are exposed to known traumatic stressors. However, if they are exposed to traumatic events, or if they have any pre-existing factors that might make them more susceptible to stress, screening should be more frequent. Guidelines emerging from the available literature are shown in Table 12.

Table 12: Screening Requirements

Group	Type of screening	Criteria
All personnel	At least early, whether exposed or not	
At risk personnel (see criteria in Table 4)	Upon exposure and/or every 6 months[10]	Recent trauma exposure History of PTSD Other concerns indicated

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[10]Intervals of every 3 months were noted in the literature for some high risk personnel.

One interesting approach noted within U.K. guidelines for the management of PTSD from the National Institute for Clinical Excellence (NICE, 2005) is that screening should be included within existing disaster plans (e.g., by disaster plan coordinators) that are executed when traumatic events happen. However, this fails to address the less widespread events that have the potential to affect first responders and receivers.

As noted earlier, there are well-established screening tools available that are easily administered. The key from an organizational perspective is having the required protocols and systems to deal with personnel showing positive screens. The treatment of PTSD is described in detail in the next chapter.

4. Treatment of-PTSD

This chapter explores the effectiveness of various treatments for PTSD. In the DoD (2010) best practice guidelines, the effectiveness of PTSD treatments is systematically evaluated within discrete blocks of time, as follows:

- first few days after exposure
- from 4 to 30 days after exposure
- more than a month after exposure (i.e., after PTSD diagnosis)

Hence, this chapter is also organized in these blocks.

Some research has specifically addressed PTSD treatments in first responders. In fact, research by Haugen et al. (2012) screened more than 845 potentially relevant articles that dealt specifically with first responders. This meta-analytic work sought reports that used a clearly defined psychosocial or pharmacological treatment for PTSD. However, from the long list of available studies, they were able to identify relatively few of sufficiently high quality. In the end, they were left with 13 observational studies and 4 randomized control trials, 2 of which used psychosocial interventions. As Haugen et al. (2012) argue, the number of studies directly addressing treatment that remained after their careful screening was very limited, particularly when compared with the range of research relevant to PTSD in military personnel:

> *"This paucity of research is particularly surprising when compared with the volume of treatment research conducted with other trauma population (e.g., combat veterans), which in turn forms the basis of PTSD treatment guidelines (though the 28 worldwide studies of prevalence for first responders analyzed by Berger et al. (2011) is in line with the limited research base on first responders)." (Haugen et al., 2012, p. 376)*

In general, this suggests that the available body of research directly exploring PTSD treatments in first responders is very limited and at a relatively early stage of development in terms of its scientific quality. Although there is research available, it is not of sufficiently high quality to enable any confident conclusions. Hence, this review focuses on best practice treatment guidelines primarily from the military domain.

4.1 Treatment Immediately After Exposure (First 4 Days)

The literature strongly suggests that once personnel are exposed to traumatic events, decreasing the probability that they will develop more serious problems requires a deliberate process of evaluating where they are, and how they have been affected by the trauma. The first step that should occur very quickly (i.e., within hours of experiencing trauma) is an immediate assessment of whether they are displaying any very atypical behaviours or "danger signs" (DoD, 2010). After this, it is important to assess their status in terms of the basics of life and well-being. Their assessments are briefly described as follows.

4.1.1 Scan for Danger Signs

At the first stage after exposure to traumatic stress, DoD (2010) guidelines emphasize the need for an assessment of the overall status and functioning of an individual. This includes the following elements:

At the first stage after exposure to traumatic stress, DoD (2010) guidelines emphasize the need for an assessment of the overall status and functioning of an individual. This includes the following elements:

Figure 7: Assessment for danger signs (DoD, 2010, p. 16)

At this stage, then, efforts are directed at understanding what the person has experienced and whether their current state seems to be problematic. Is the person still functioning within normal ranges, are they "acting out", is there any evidence of medical or serious mental health concerns? This assessment ends with a determination of whether the person involved is in any imminent danger to self or others (e.g., suicidal), and whether any immediate intervention is required. Again, as noted earlier, personnel exposed to traumatic events have been shown to be at higher risk for suicide. According to Foa et al. (2002; cited in DoD, 2010, p. 33):

> *"...the routine assessment of all patients dealing with acute stress symptoms should involve a careful evaluation of current suicidal ideation and past history of suicidal attempts."*

If there is cause for concern identified with respect to any of these issues, appropriate supports need to be immediately initiated (e.g., hospital, physician, mental health professional depending on the presenting problem). If there is no immediate cause for concern, the assessment progresses to the next stage.

4.1.2 Support Immediate Needs

Assuming there are no serious concerns stemming from the "danger signs" assessment, efforts should go toward addressing any immediate physical or psychological needs of personnel exposed to trauma. This could range from basic food and water to working to help them activate their social supports so they can begin communication with their loved ones and natural supports.
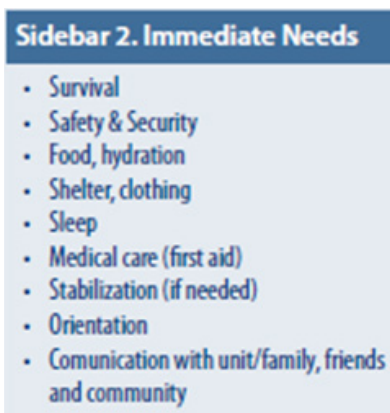
Figure 8: Assessment for immediate needs (DoD, 2010, p. 16)

Personnel exposed to traumatic stressors need to be observed for stress-related symptoms. This is important because of the traumatic stress continuum, as acute stress reaction is a warning sign of possible

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progression to PTSD. Within the first few days after exposure, it is normal and expected for personnel exposed to traumatic stressors to show or report some stress-related symptoms. For many personnel, these symptoms will dissipate within the first few days after exposure. For personnel in this category, informal approaches such as psychological first aid, normalization and education/training) may be helpful.[11] If serious stress-related symptoms persist after 4 days or if personnel show seriously diminished functioning, acute interventions should be initiated. These interventions are described in the section that follows.

4.2 Acute Treatment in First 30 Days[12]

In the long run, whether stress-related symptoms are likely to require formal treatments is a matter of degree and type of stress experienced. For example, sleeplessness is often associated with traumatic stress, but more serious symptoms like constant dissociation (i.e., breaks from reality) or severe hyper-arousal (i.e., being unable to slow down) may be more cause for concern.

For personnel continuing to show symptoms of traumatic stress at least 4 days after exposure (but before the end of 30 days), there are a number of possible treatment approaches. These treatments are aimed at decreasing the stress that people are experiencing and/or decreasing the probability that their condition will progress to full-blown PTSD. The efficacy and the effectiveness of many common approaches have been evaluated to varying degrees (e.g., DoD, 2010, Institute of Medicine, 2012) and this section explores early acute treatments. At this early stage, psychotherapeutic approaches are relevant, but pharmacological approaches are not, as they are typically only given in response to a PTSD diagnosis.

However, it is critical to note that there is some evidence suggesting that attempting to formally treat personnel who are not showing symptoms of traumatic stress is not only counterproductive, but may actually be harmful (Roberts, Kitchiner, Kenardy, & Bisson, 2009a). All the treatment options that follow, then, should be used only with personnel who are actually showing traumatic stress symptoms.

4.2.1 Cognitive Behaviour Therapy

Cognitive behaviour therapy (CBT)techniques have emerged from the work of Ellis (1962) and Beck (1964). CBT is an umbrella term for a range of different approaches that includes exposure therapies like prolonged exposure (PE), cognitive processing therapy, eye movement desensitization and reprocessing (EDMR; Watts, Schnurr, Mayo, Young-Xu, Weeks, & Friedman, 2013).[13] CBT is administered by trained professionals, typically therapists and mental health professionals.

CBT is a process intended to help identify problematic beliefs, to challenge or disrupt these beliefs by exploring evidence against them and to replace the beliefs with more logical and reality-based beliefs (DoD, 2010). Similarly, Foa et al. (2013) identify common characteristics across different types of CBT therapies. CBT approaches work to lessen avoidance, either by exposing patients to problematic stimuli while reinforcing non-avoidant behaviours, or by working to eliminate faulty cognitions that are linked with avoidance. To do this, CBT therapies involve the creation of "safe trauma reminders" through discussing or otherwise approaching trauma-related images or events. Second, CBT works to diminish "dysfunctional, unrealistic perceptions emerging from the traumatic experience" (Foa et al., p. 73). The many different forms of CBT focus on changing problematic beliefs and emotions (e.g., survivor guilt, self-blame). CBT approaches, then, help people work through a trauma and how it impacts on their views of themselves and their world. An important distinction noted in the literature is between trauma-focused therapy (i.e., therapy that focuses on the specific trauma that has been experienced) and non-trauma-

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[11] Even for personnel in the latter category, however, regular screening will still be required. DoD best practice guidelines argue that screening (once exposed to traumatic stress) should ideally recur after 3 to 6 months, and yearly in general.

[13] Stress inoculation training and anxiety management programs (NAP, 2012) are sometimes included as forms of CBT, but more often treated on their own. As such, they are considered separately in this report.

focused therapy (i.e., therapy that focuses on changing behaviour and beliefs without referring to any specific traumas). The available literature consistently shows that trauma-focused therapy is more effective than the alternative (e.g., Bisson & Andrew, 2007).

Trauma-focused CBT is identified as being the most effective treatment for traumatic stress, both acute stress disorder (i.e., between 4 to 30 days) and after diagnosed as PTSD. The research reviewed for this report shows very strong evidence in support of trauma-focused CBT. For example, Forneris et al. (2013) concluded that CBT was more effective than just supportive counselling in reducing the severity of PTSD symptoms. Another Cochrane Collaboration review(Roberts et al., 2009b) explored the results of only randomized controlled trials (RCT), and results showed that trauma focused CBT[14] was one of the two best treatments for individuals. Providing CBT showed strong positive effects on PTSD symptoms, depression and anxiety, and trauma-focused treatment was better than non-trauma focused treatment (e.g., stress management and other therapies).

Although there are many possible elements to CBT treatments, the Bryant CBT for acute stress disorder (Bryant, Sackville, Dang, Moulds & Guthrie, 1999; cited in Haugen et al., 2012) is described as 12-75 minute sessions with the following activities:

- Psycho-education
- Treatment rationale and contracting
- Breathing exercises
- Imagined exposure
- Gradual in-vivo exposure
- Cognitive reprocessing

Other variants of CBT are also noted in the literature. For example, Brief Eclectic Psychotherapy (BEP), conducted in 16-60 minute sessions, is argued to include some elements of CBT (e.g., psycho-education and imagery guidance, but focuses more specifically on "meaning and integration" and working to redefine one's image of self and of the world (because these have been changed by exposure). Moreover, BEP also uses a "farewell ritual" (destroying a memento) to represent the "loss associated with the critical incident" and "a return to normal life" (Haugen et al., 2012, p. 376). Although they note few available studies to judge the efficacy of BEP, the meta-analysis of Haugen et al. show BEP to be an effective treatment. However, this form of therapy is not prominent in the available literature.

Overall, then, it is clear in the available literature that trauma-focused cognitive behaviour therapy is the best established treatment of choice for treating personnel experiencing continuing to show traumatic stress symptoms between 4 and 30 days after exposure.

4.2.1.1 Exposure Therapy

Exposure therapies have been shown to be effective in many RCTs, and are indicated as "a first line treatment for PTSD" in military guidelines (e.g., DoD, 2010, p.73). Our review of the literature supports this conclusion (Bisson & Andrew, 2007; Cigrang, Raunch, Avila, Bryan, Goodie, Hrysko-Mullen, & Peterson, 2011; Foa et al, 2013; IOM, 2012; Orsello & Alfonzo, 2012; Pratchett, Daly, Bierer, & Yehuda, 2011). RCTs have shown that PE is effective for reducing PTSD symptoms in a wide range of populations including war veterans and has been effective for both chronic PTSD and acute stress disorder (Foa et al., 2013). Cigrang et al (2011) found that the use of PE, especially in combination with cognitive processing therapy, reduced PTSD symptoms along with comorbid depressive symptoms and improved overall mental health.

> "PE produces significantly greater pre- to post treatment reductions in PTSD symptoms compared with supportive counseling (Bryant, Moulds, Guthrie, Dang, et al., 2003; Schnurr et al., 2007), relaxation training (I. Marks, Lovell, Noshirvani, Livanou, &

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[14]The other treatment was EDMR

*Thrasher, 1998; Taylor et al., 2003; Vaughan, Armstrong, Gold, & O'Connor, 1994),
and 'treatment as usual,' including pharmacotherapy (Asukai, Saito, Tsuruta, Kishimoto,
& Nishikawa, 2010), nonexposure-based individual psychotherapy (Boudewyns et al.,
1990), and combinations of psychopharmacology, counseling, and group therapy (e.g.,
Nacasch et al., 2010). (Foa et al., 2013, p. 74)*

According to Foa et al. (2013), there have been more RCT studies that show support for the effectiveness of PE than any other treatment for PTSD. Moreover, patients also rate PE to be as good as or better than other treatments (Foa et al, 2013).

In general, then, there is strong support for the efficacy of exposure therapy in treating traumatic stress.

4.2.1.2 Eye Movement Desensitization and Reprocessing

Eye movement desensitization and reprocessing (EDMR) is a therapy introduced more than 20 years ago, and is noted in many points in the literature as one way to treat PTSD. This form of therapy involves focusing on recalling a traumatic event while receiving stimulation causing eye movements (e.g., tracking the moving finger of a therapist). As negative emotions come to the fore, the patient is trained to focus on positive rather than negative thoughts (Keane et al., 2006). This approach has been argued to facilitate the processing of traumatic memories, to reformulate cognitions while managing physiological arousal. Although relatively prominent in the literature, this approach has been criticized for lacking grounding in established theories of human behaviour, cognitive science and learning (e.g., McNally, 1999; cited in Keane et al., 2006).

The efficacy of using EMDR for treating PTSD is somewhat contested. On one hand, some researchers have promoted its effectiveness. Research by Bisson and Andrew (2007a) argued thatEMDR is better than wait list/usual care in reducing symptoms, depression and anxiety. EMDR, they argued, was more effective than stress management and other therapies. In fact, this work argues that EMDR is as effective as trauma-focused cognitive behaviour therapy (TFCBT). Despite this optimistic conclusion, however, Bisson and Andrew (2007a) reported analyses showed that the net impact of EMDR was not statistically significant better than that of other therapies. As such, this finding has low validity in our opinion. However, the DoD (2010) guidelines note the efficacy of EMDR treatment without clearly including this unique form of therapy in any of their best practice guidelines. Our speculative interpretation is that this might represent conflicting opinions about the efficacy of this treatment on the part of the DoD experts.

Strong meta-analytic research by Albright and Thyer (2010) explored high quality empirical research exploring the effectiveness of EMDR. Studies included in this meta-analysis had to be either a randomized control trial (RCT) or to have used a quasi-experimental design. Further, the studies had to include participants with an actual diagnosis of PTSD, PTSD outcome measure, published between 1987 and 2008 and in the English language. In all, they were able to identify 6 RCTs that met their quality criteria and 3 quasi-experimental studies. They argued that the current literature does not provide satisfactory scientific proof that EMDR is effective, in part because past studies have often compared outcomes relative to no treatment at all.

> *"Findings from these studies present very limited evidence supporting the effectiveness of
> EMDR in reducing PTSD in combat veterans. (SENTENCE REMOVED). There are no
> well designed RCTs comparing EMDR against real-life exposure therapy, a treatment
> with a much stronger level of empirical support in the treatment of PTSD, or, for that
> matter, against credible placebo-controlled therapies." (Albright & Thyer, 2010, p. 13).*

In short, they argue, more studies that pit EDMR are necessary to fully understand its impact and to reasonably argue that it is a truly effective form of treatment. Until more rigorous and controlled studies can be done, they argued that:

"To the extent that the victims of combat-related PTSD deserve to receive therapies consistent with evidence-based practice, it can be currently seen as premature to offer EMDR except as an experimental treatment provided in the context of well-designed and properly controlled outcome studies." (Albright & Thyer, 2010, p. 14).

Overall, then, although EMDR is a treatment that is prominent in the PTSD literature, Albright and Thyer's (2010) assertion that more research is required to ascertain its effective seems a reasonable conclusion.

Summary - As this section suggests, then, cognitive behaviour therapy and its emphasis on re-experiencing stressors and learning to thinking differently about them is an effective way to deal with PTSD. However, CBT has many different facets, and some of the most effective interventions are argued to include combinations of exposure (e.g., in-vivo and imaginative/oral narrative), cognitive restructuring, relaxation/stress modulation techniques, and psycho-education. In general, trauma-focused CBT is the most effective and the treatment of choice for managing PTSD and exposure-based therapies are also quite effective.

4.2.2 Psychological Debriefing

Debriefing is a broad term for interventions used to help mitigate the negative impacts of exposure to traumatic stress. Perhaps the most prominent form of debriefing in the literature is critical incident stress debriefing (CISD[15]). CISD is a specific process that represents one part of an overall approach to supporting people exposed to trauma that is labelled as the Critical Incident Stress Management (CISM) model. CISD (Mitchell, 1983) is defined as "individual or group discussion of a traumatic event, delivered quickly within the wake of a traumatic event exposure, which allows victims to verbally express their cognitive and emotional experience of a cognitive event" (Feldner et al., 2007, p. 87). This debriefing is the 4th phase in a seven step process and is usually done within 1-7 days after a traumatic event has occurred.

Although CISD is the best known debriefing approach, the literature shows other types of debriefing that emphasize different elements, some with commonalities with CISD and some that are quite different from it. There is also wide variance in whether these interventions are given by professionals or non-professionals with varying experience and backgrounds, how process is assessed, and even the time between the traumatic event and the debriefing (van Emmerick, Kamphuis, Hulsbosch, & Emmelkamp, 2002). Counselling, education and group debriefing are non-CISD examples (van Emmerick et al., 2002). Perhaps the only consistently cited commonality among these many forms of debriefing (CISD and non-CISD) is that they are delivered within a single session. Accordingly, the term "single-session debriefing" is common in the literature.

The CISD approach is reported to have stemmed from the involvement of its creator, Jeff Mitchell, in training for the State of Maryland (McEvoy, 2005). Mitchell is reported to have done his first CISD in 1974 after multiple family members were killed by a drunk driver. He is reported to have seen an association between high attrition rates for fire and EMS personnel and the occurrence of critical incidents. Subsequently, in 1982, he wrote an article in RESPONSE! Magazine (aimed at first responders) that introduced the CISD process to the community (McEvoy, 2005). Since that time, CISD has been used extensively, particularly within the emergency response and first responder communities.

This 2-3 hour discussion, led by a CISD facilitator (trained peer support person or mental health professional), does not attempt cognitive restructuring or cognitive-behavioural exposure, but promotes "verbal ventilation of emotion" and help to reduce stress and make sense of the event. Seven formal steps of CISD are:

- Introduction (ground rules and objectives)

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[15]This process is part of a larger model entitled the Critical Incident Stress Debriefing Model (CISM, Mitchell, 1983).

- Facts (facts of the trauma reviewed)
- Thoughts and experience associated with event discussed
- Reactions phase – encouraged to vent feelings
- Review symptoms experienced
- Teaching – review of stress management strategies
- Re-entry phase – summary and wrap up

The effectiveness of CISD has been hotly contested, with detractors noted as early as 1996. In the Journal of Emergency Medical Services, the senior editor was reported to have argued that CISD had become a "business venture" even though she argued that there was no strong evidence of its effectiveness (McEvoy, 2005). This article was reported to spur a great deal of interest, and according to McEvoy, battle lines were "clearly drawn in the sand" about whether CISD was actually effective or not.

This interest has persisted, as evidenced by the 15 reviews noted by Feldner (2007) to have been previously published in the previous 5 years. Although some studies we reviewed purported to show the positive effects of CISD (e.g., Everly, Flannery & Eyler, 2002), the quality of existing research purporting to support CISD is low (e.g., no control group, no randomization and inconsistent interventions)(e.g., Fawzy & Gray, 2007). As such, the assertion that CISD is effective seems tenuous because of the low scientific quality of the studies supporting its effectiveness (e.g., Everly et al., 2002).

More commonly, psychological debriefing has been argued to be either ineffective or actually even harmful. An earlier review done by van Emmerik et al. (2002) used a meta-analysis to compare the effectiveness of CISD vs. non-CISD single session debriefing treatments. Studies included were required to have single session debriefing was done within 1 month of the event, strong clinical outcome measures and pre- post interventions. Of the 29 studies initially found, only 7 met the criteria and had sufficient scientific quality to be used. Five of these studies were RCTs, and the influence on PTSD outcomes was assessed by comparing CISD vs. non-CISD interventions. Results showed non-CISD interventions helping moderately to reduce PTSD symptoms. However, the impact of CISD was less than for non-CISD interventions and even when no briefings were provided. van Emmerick et al. (2002) concluded that "Despite the intuitive appeal of the technique, CISD has no efficacy in reducing symptoms of post-traumatic stress disorder, and in fact suggest that it has a detrimental effect" (p. 769).

Another influential review done for the Cochrane Collaboration evaluated the results of 6 RCTs conducted during the 1990s and showed single session debriefing was no better at preventing than receiving no debrief (Rose, Bisson & Wessely, 2003). In fact, this review again suggested that the long-term odds of experiencing PTSD may actually even increase when single session debriefing is used. Recent reviews by Forneris et al. (2013; NAP, 2012) and the DoD (2010) strongly assert that psychological debriefing should not be used as a treatment for PTSD. Similarly, a review undertaken by an advisory council of the American Red Cross (American Red Cross Scientific Review, 2010) sought to evaluate the scientific evidence in support of (and against) use of CISD. Evidence from 39 citations of research was considered. Key variables assessed were the quality of the study design, intervention provider information, interventions, outcome measures and the outcomes of the study. The conclusion of American Red Cross council was as follows:

> "There is no convincing evidence that psychological debriefing or group debriefing are effective in reducing PTSD. CISD/CISM interventions have not been shown to be effective in either eliminating or lessening the development of PTSD and should not be used for rescuers following a potentially traumatizing event. There is evidence that CISD/CISM interventions may have deleterious effects by interfering with normative post-trauma reduction resiliency. (II)" (American Red Cross Scientific Review, 2010, p. 5).

This conclusion is consistent with one asserted years earlier by Bisson, Jenkins, Alexander & Bannister, 1997 (cited in Feldner et al., 2007) who argued that:

> *"CISD may interfere with natural (typical) recovery from a traumatic event (McNally et al., 2003[16]), perhaps by increasing postevent arousal, which may facilitate overencoding and/or exacerbation of traumatic event-related memories." (Feldner et al., 2007, p. 88).*

The process of talking about the traumatic event soon after it occurs, then, might interfere with the natural systems that people have for managing trauma (Forneris et al., 2013). Simply put, psychological debriefing assumes that everyone exposed to a traumatic event needs to be treated, and this may not be the case. Rather than using psychological debriefing whenever and wherever trauma occurs, then, screening is advocated to determine whether trauma is actually problematic for a given person before starting treatment. And, when treatment is indicated, psychological debriefing is not a method that should be used.

Despite these conclusions, however, is still widely available as a treatment approach. Entire companies specializing in the application of CISD have emerged and are still active. For example, CISM International (http://www.criticalincidentstress.com/home) is a company in Texas that specializes in providing CISD and CISM. There is also evidence that CISM continues to be used in many organizations, such as in the Civil Air Patrol of the United States Air Force Auxiliary (http://cism.cap.gov/). Even within Canada, the Justice Institute of British Columbia (a public safety education and training centre; http://www.jibc.ca) offers several courses related to critical incident stress debriefing.

The available research, then, shows a good level of agreement that psychological debriefing should not be used. Although this conclusion remains contested, given the apparent potential for harm, psychological debriefing after exposure to traumatic stress should be avoided.

4.2.3 Psychological First Aid

One option sometimes used soon after personnel are exposed to trauma is psychological first aid. Psychological first aid can be defined as "an evidence informed modular approach to help [referents removed]….in the aftermath of disaster and terrorism" (Brymer, Jacobs, Layne, Pynoos, Ruzek, Steinberg et al., 2006, p. 19). Other sources define it as "a modular approach to providing psychosocial and emotional help to victims of traumatic events" (Justice Institute of British Columbia, 2013). Formally, it is intended to be delivered by disaster workers and other mental health professionals, but informally within the literature, psychological first aid is also described as delivered by peers and colleagues.

With the decreased support for single session debriefing, some authors argued that psychological first aid approaches have become increasingly prominent (McEvoy, 2005, Roberts et al., 2009a). Psychological first aid is defined as the "provision of basic comfort, information, support and attendance to immediate practical and emotional needs" (McEvoy, 2005, p. 3). According to McEvoy (2005), psychological first aid aims to help traumatized personnel to re-establish a sense of safety and self-efficacy and to reconnect with their natural support systems. The core components of psychological first aid are shown in Table 13.

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[16] cited in Feldman et al., 2007

Table 13: Components of Psychological First Aid (Brymer et al., 2006, p. 19)

Element	Description
Contact and Engagement	Respond to contacts initiated by affected persons, or initiate contacts in a non-intrusive, compassionate, and helpful manner
Safety and Comfort	Enhance immediate and ongoing safety, and provide physical and emotional comfort
Stabilization (if needed)	Calm and orient emotionally overwhelmed or distraught survivors
Information Gathering – Current Needs and Concerns	Identify immediate needs and concerns, gather additional information, and tailor PFA interventions
Practical Assistance	Offer practical help to the survivor in addressing immediate needs and concerns
Connection with Social Supports	Help establish opportunities for brief or ongoing contacts with primary support persons or other sources of support, including family members, friends, and community helping resources
Information on Coping	Provide information (about stress reactions and coping) to reduce distress and promote adaptive functioning
Linkage to Collaborative Services	Link survivors with needed services and inform them about available services that may be needed in the future

Psychological first aid, then, extends from ensuring the basics of life to working to inform personnel in a generic way about stress and coping mechanisms and how they can adapt to the trauma that they have experienced. It also aims to draw in their natural support systems. Unlike many other interventions, psychological first aid is intuitive, and many elements can be administered by experienced personnel rather than those specifically trained in stress management. As noted by McEvoy (2005), "Many fire and EMS departments already practice parts of PFA. Every department should have a plan in place for personnel exposed to psychologically traumatic events." In fact, recognizing the move away from CSID, Mike McEvoy, an experienced EMS coordinator, advocated "If your department plan for members exposed to traumatic events is to call the CISD team, don't abandon your personnel by doing nothing at all. Consider instead what more you could offer your colleagues." (namely, psychological first aid). This quote, then, clearly shows that psychological first aid has received more support as a safe alternative to psychological debriefing.

Unfortunately, despite the prominence of psychological first aid as a treatment at the early stages of traumatic stress, there is little strong scientific research that empirically supports its effectiveness. This is apparent from a "Field Operations Guide" for using psychological first aid co-published by the National Child Traumatic Stress Network and the National Center for PTSD. This guide explicitly argues that despite the strong empirical support for psychological first aidas a holistic treatment, the various modules of PFA have been proven to be effective (Brymer et al., 2006). Other researchers seem to agree with this assessment. Although the evidence supporting psychological first aid remains somewhat lacking, the general conclusion in the available literature is that itmight offer some benefit (DOD, 2010). Given that the elements of psychological first aid are relatively intuitive, low risk and can fairly easily be provided, this practice is advocated as one way to provide comfort to personnel exposed to trauma.

4.2.4 Psycho-education/Normalization[17]

Psych-oeducation and normalization can play an important role <u>after</u> personnel have been exposed to a traumatic event. For example, it is important to "normalize" acute stress reactions as common but transient and emphasize that they "do not indicate personal failure or weakness, mental illness or health problems" (DoD, 2010, p. 15).This can make them aware of how the body normally responds to stress and to tell them that the stress-related symptoms (e.g., dissociation, re-experiencing, etc.) they might be experiencing are expected and normal.[18]For a first responder having flashbacks of a horrific accident scene, then, psycho-education would help them understand the normal human response to such an event. Efforts to educate and to normalize the experience of personnel exposed to trauma work to ensure that they know their stress responses are expected and typical and to assure them that they are not "going crazy" (DoD, 2010, p. 25), a common response when people have difficulty coping after a traumatic event. Normalization is important because denial or dissociation from the distress that people are experiencing is a positive predictor of progression to either acute stress disorder (ASD) or subsequent PTSD. Psycho-eduation assures traumatized personnel that they are behaving in a reasonable way given what they have experienced, they are not weak or inadequate if they are having symptoms, and that traumatic symptoms are often transient.

Although there are no formal restrictions on who can provide psycho-education, many systems such as the military use stress management debriefing from trained mental health professionals but not necessarily trainers familiar with the target domain. For example, within the Canadian Forces, a typical approach involves providing personnel with a stress management briefing some time before they enter stressful situations. Thompson and McCreary (2006) argue that, unfortunately, the value of a typical CF military stress management briefing is limited because it is academic and sterile rather than pragmatic and operationally focused, provides no "hands on" training and further perpetuates negative stereotypes about mental health. These factors, they argue, conspire to undermine the relevance and importance of stress briefing information, and, as a consequence, this information fails to be integrated into the learning of military personnel. Thompson and McCreary argue that training should include mental readiness principles and should highlight cognitive and physiological responses to stress and how these can affect decision-making (Thompson & McCreary, 2006).It may also be important to ensure that personnel giving these "lectures" are seen to be credible experts with at least some knowledge of the high-risk domain that their lectures are addressing. Lastly, psycho-education efforts need to be strongly integrated with real-world operational knowledge and training.

Within the available literature, there is some general agreement on the potential value of psycho-education and normalization efforts, but there is little strong scientific support for these approaches. According to the DoD best practice guidelines, although they seem to offer some benefit, the scientific evidence is inconclusive.

4.2.5 Social Support

Social support refers to the level of support an individual feels from family members, friends, coworkers, and community helping resources. For example, unit cohesion is an indicator of social support in a first responder or military environment (DOD, 2010).

As PTSD is often associated with withdrawal from social activities, limiting friendships, and decreased emotional intimacy, social support treatment should include the following (DoD, 2010):

- Immediately after trauma exposure, preserve an interpersonal safety zone protecting basic personal space (e.g., privacy, quiet, personal effects).

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[17]These interventions are often subsumed into the category of "psychological first aid".

- As part of Psychological First Aid, reconnect trauma survivors with previously supportive relationships (e.g., family, friends, unit members) and link with additional sources of interpersonal support.
- Assess for impact of PTSD on social functioning.
- Facilitate access to social support and provide assistance in improving social functioning, as indicated.

There is good evidence of a significant relationship between the social supports that a person has and their susceptibility to PTSD. Specifically, research by Brewer et al. (2000; cited in Charuvusta and Cloitre, 2008) showed a mid-range impact (i.e., effect size of .4) and Ozer et al., 2003(cited in Charuvusta and Cloitre, 2008) found a slightly lower but still significant impact (i.e., effect size of .29). This latter research showed social support as the second highest predictor of PTSD risk (after peri-traumatic dissociation). This relationship is argued to be strong both because social support performs a protective function, as well as because low levels of social support make one more vulnerable to PTSD. Social support has been shown to be associated with lower suicide risk and decreased PTSD in a Canadian military sample (Nelson, St. Cyr, Corbett, Hurley, Gifford, Elhai & Richardson, 2011).

The level of one's social support, both real and felt, has been found to impact on PTSD symptoms for first responders/receivers. For example, Meyer et al. (2012) found that lower perceived social support was a PTSD risk factor for firefighters exposed to a potentially traumatic event. In addition, Marchand et al. (2013) found that perceived and actual positive support from coworkers both during and after a traumatic event helped to avoid or lessen the severity of PTSD in police officers. Prati and Pietrantoni (2010) suggest that social support may lessen the severity of PTSD symptoms by influencing first responders' interpretations of traumatic events. In addition, supportive others may influence first responders' emotional states and provide help to identify adaptive coping strategies. The social support provided by peers and patients has been argued to help nurses to cope with job stresses more effectively (Kerasiotis & Motta, 2004).

Although there is some evidence that social support is associated with lower PTSD risks, tightly controlled research that confirms its direct impact is currently not available. Hence, strong conclusions about its efficacy cannot be made. However, there is good agreement that social supports show some benefits in lowering the risks of PTSD, and this form of treatment needs to be better understood.

4.2.6 Summary of First 30 Days of Treatment

Within the first 30 days after exposure to traumatic stress, then, it is important to closely assess personnel exposed to traumatic stress, in terms of both their basic safety and functioning and in terms of their ongoing responses and actual functioning in light of the stresses that they have faced.The approach to be taken depends on whether a given personnel is showing signs of traumatic stress. Treatments can be categorized in terms of being either informal (i.e., done easily by leaders, peers and colleague) or formal treatments (i.e., requiring professional expertise). On the formal side, CBT is the best-established therapy and a related therapy that uses exposure is also well proven. Psychological first aid, education/normalization and social supports are less formal types of support.

Based on the available research, then, advice about approaches that should be used under different conditions is shown in Table 14.

Table 14: Approaches after exposure to traumatic stress (first 30 days)

Timeline	Condition	Required Approach
Up to 4 days after exposure	No symptoms of traumatic stress	Offer informal support if necessary (e.g., psychological first aid, normalization, social support)
	Showing symptoms of traumatic stress	Offer informal support (e.g., psychological first aid, normalization, social support) for up to 4 days (see

		Table 15).
4 – 30 days after exposure	No symptoms of traumatic stress	Do not treat formally (e.g., CBT or debriefing), continue to offer informal support (e.g., psychological first aid, normalization, social support)
	Showing symptoms of traumatic stress	Consider formal treatment (e.g., CBT)

For personnel showing symptoms of traumatic stress within the first 30 days of exposure, there are a number of possible treatment approaches, as shown in Table 15.

Table 15: Interventions up to 30 days after exposure (adapted from DoD, p. 24)

Treatment	Benefit vs. Harm	Scientific Status of Conclusion	Advice for First Responder/Receiver Community
Trauma-focused CBT (4-5 sessions; including exposure therapy)[19][20]	Significant benefit	Strong evidence	✓✓✓✓✓ - definitely use – empirically supported
Social support	Some benefit	Inconclusive	✓ - ok to use but not well researched
Individual psychological debriefing	No benefit and POTENTIAL HARM	Not recommended	✗ - do NOT use
Group psychological debriefing	Undetermined	No benefit seen but no evidence of harm	✗ - do NOT use
Psychotherapy for personnel without symptoms	No benefit and POTENTIAL HARM	Not recommended	✗ - do NOT use
Education and normalization	Some benefit	Inconclusive	✓ - ok to use but not well researched
Psychological first aid	Unknown benefit	Undetermined	✓ - ok to use but not well researched

What this table suggests, then, is that trauma-focused CBT is the most effective and best empirically supported treatment and that social support, education and normalization are seen to offer some benefit. However, although psychological first aid is argued as likely to be helpful ways to treat PTSD, there is very little empirical evidence showing its effectiveness within the first 30 days of treatment. This does not mean that they have been shown to be ineffective, merely that the necessary research has not yet been done. The effectiveness of interventions immediately after exposure to traumatic stressors is yet to be fully tested. However, other than psychological debriefing, these treatments so no evidence for being harmful, so psychological first aid, education and normalization and social support may be used given a lack of other viable alternatives.

As these summary tables suggest, then, there are both formal and informal treatments. On the formal side, CBT is the best-established and a related therapy that uses exposure is also well-proven. EMDR therapy, in our view, is contested in the literature and the effectiveness of this therapy remains unproven (Albright & Thyer, 2010). A critical conclusion arising from the literature is that psychological debriefing could be harmful andshould be avoided.

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[19]Note that in the available literature CBT can be provided within the first 30 days, even in the absence of a definite PTSD diagnosis, presumably in cases where personnel are showing serious stress-related symptoms and greatly diminished functioning.
[20]This category excluded EDMR treatment, as its efficacy is contested in the literature and high quality meta-analytic research showed it to be ineffective.

To this point, then, treatments within the first 30 days after exposure to a traumatic event have been considered. At this point, personnel are considered to be suffering from either acute stress disorder. The literature suggests that starting formal CBT with these personnel may be an effective way to lower the chances that their symptoms will not continue to progress to full-blown PTSD. The next section considers the process of diagnosing PTSD, typically occurring after the first 30 days of exposure.

4.3   Treatment after PTSD Diagnosis

Treatment after PTSD is diagnosed can involve either psychotherapeutic approaches or pharmacological approaches.

Psychotherapeutic treatment has been shown to be somewhat effective at treating PTSD (DoD, 2010; Bisson & Andrews, 2007a). Research has shown substantial improvements in the quality of life (Foa et al., 1999; cited in Foa et al., 2013) of people who have received PTSD treatments. An important point noted in the literature is that when considering treatment options, it is important to consider both the potential positive benefits and the risk of harm.

The most common psychological treatments and pharmacological treatments are explored in the sections that follow.

4.3.1   Cognitive Behaviour Therapy

As discussed in detail earlier in this section, cognitive behaviour therapy is widely recognized as the therapy of choice for treating PTSD after exposure to traumatic stress. Our review of the literature related to CBT after PTSD is formally diagnosed also provided overwhelming evidence of its efficacy. For example, within the available literature, there is strong support for the effectiveness of different cognitive behavioural therapies for treating PTSD once diagnosed, as follows:

Within the available literature, there is strong support for the effectiveness of different cognitive behavioural therapies for treating PTSD once diagnosed, as follows:

- cognitive processing and prolonged exposure decreased PTSD symptoms (Cigrang et al., 2011)
- support for CBT (Ehlers, Bisson, Clark, Creamer, Pilling et al., 2010; Haugen et al., 2012; Roberts et al., 2009)
- support for CBT and pharmacological approaches combined (Pratchett, Daly, Bierer & Yehuda, 2011)

However, it is important to note that the efficacy of CBT as a treatment option seems to be best understood once PTSD has actually been diagnosed.

A meta-analytic review (Haugen et al., 2012) using only scientifically strong studies (i.e., randomized controlled trials or RCTs) showed strong effects of treating PTSD once diagnosed. Specifically, these studies supported the use of Cognitive Behavioural Therapy (CBT) as a first-line treatment for PTSD. Evidence also supports the use of Brief Eclectic Psychotherapy (BEP) as a first-line treatment in police officers. However, as Haugen et al. (2012) argue, only two studies do not provide a strong basis for making assertions about treatments for all first responders. Accordingly, they conclude that "Though both RCTs showed significant large treatment effects (d = 1.37; h = 0.92), the literature is surprisingly sparse and is not sufficient for evidence-based recommendations for first responders". Put simply, this recent research suggests that clear and empirically-based advice for treating PTSD in first responders is currently lacking. This confirms that using research from other areas (e.g., military) may be the best way to ensure evidence-based treatment for the time being. For the future, however, this is a serious gap that will need to be addressed.

4.3.2 Stress Management Training

The evidence related to a variety of other stress management approaches for treating PTSD is less clear. Stress management training (SMT) has been used fairly extensively in applied contexts. SMT is defined simply in the literature as "training in applying any set of techniques aiming to improve how people cope with stress" (Bouchard, Bernier, Boivin, Morin & Robillard, 2012, p. 2). An important distinction made in the literature is between stress training and training in general. Whereas training aims to promote the development of knowledge, skills and abilities, stress training is specifically geared to helping individuals to perform effectively in high intensity environments (Driskell and Johnston, 1998).

A systematic review of the literature on the effectiveness of stress management training techniques has shown a range of techniques under the umbrella of SMT, from prayer to specific breathing techniques, relaxation, stress exposure, cognitive restructuring. Other researchers have reportedly categorized these techniques in terms of primary, secondary or tertiary interventions (Murphy & Sauter, 2003; cited in Bouchard, Guitard, Laforest, Dumoulin, Boulanger & Bernier, 2012). Primary interventions aim to modify the environment to change the origins of stress response, secondary interventions focus on reducing the intensity of stress-related symptoms and tertiary interventions involve applying SMT to existing physical and mental disorders. In addition to a wide range of SMT techniques, there are also specific and well-bounded interventions such as Stress Inoculation Training (SIT) and Anxiety Management Training (AMT; Bouchard et al., 2012).

For treating PTSD, stress and anxiety management approaches have been shown to be better than wait list/usual care at reducing symptoms and depression/anxiety, but the value of this finding is limited by the small sample sizes used. As such, it provides only limited evidence that these approaches are effective (Bisson & Andrew, 2007).

4.3.2.1 Stress Inoculation Training

Stress Inoculation Training (SIT) was developed by Don Meichenbaum (1977) asa form of cognitive behaviour therapy individually tailored to the trainee to produce more 'stress hardy' or resilient individuals. SIT focuses on helping people to better control their natural stress response (e.g., through breathing and relaxation exercises, to control their thinking (e.g., stopping negative thoughts) and using exposure techniques (e.g., in-vivo simulation). In this sense, there is considerable overlap between the cognitive behaviour therapies noted above and SIT.

Although initially developed as a clinical intervention, SIT has been used a range of applied contexts (i.e., health care, military), to promote better coping with a range of stressors (e.g., chronic illness, traumatic stress, job stress, surgery, sports competitions, military combat etc.), with a wide range of people (e.g., individuals, couples, small and large groups) (e.g., Meichenbaum, 1996, Saunders, Driskell, Johnston & Salas, 1996). However, this research is limited because it does not specifically address the impact of SIT on PTSD.

The DoD best practice guidelines promote the effectiveness of stress inoculation training, and present it as a "first-line alternative to trauma-focused psychotherapies for treating PTSD"(DoD, 2010, p. 116). Unfortunately, our assessment of the available literature shows only limited support for the efficacy of stress inoculation training for reducing PTSD in military contexts (e.g., Hourani, Council, Hubal & Strange, 2011). Relevant to this review, however, there is some older research showing the efficacy of SIT at lowering traumatic stress. For example, research by Foa, Dancu, Herbree, Jaycox, Meadows, and Street (1999) compared SIT with exposure training and a treatment that combined both while exploring the PTSD symptoms of female assault victims. Results that SIT was equally effective to prolonged exposure on most outcome measures. Interestingly, however, Rauch and Foa (nd, p. 3) note that all of the available studies exploring SIT and PTSD have been conducted with female assault victims, leading them to conclude that more research is required to make the claim that it will help with PTSD in a broad range of personnel.

> *"While these results are expected to relate to other individuals experiencing traumas, studies examining this expectation should be conducted before SIT can be recommended as a general treatment for PTSD."*

In our view, although SIT may be shown to be effective at treating PTSD, there is currently only limited evidence showing its effectiveness of SIT for treating PTSD (outside of research with one specific target group). As such, although stress management approaches seem likely to be helpful, the definitive research within a broad range of stressful contexts does not yet seem to have been done.

4.3.3 Group Treatments

A very recent meta-analysis explored the efficacy of group PTSD treatments (Sloan, Feinstein, Gallagher, Beck, & Keane, 2013). Interestingly, the authors note that although group treatment is commonly used in general health care centres, it is not listed in the DOD's approach to PTSD in the U.S. Sloan et al. used a scientifically stringent approach to exploring the impact of treating PTSD at the group level. Exploring the outcomes after group treatments in 16 studies (total of 1686 participants) show that group therapy for PTSD resulted in a significant reduction in the severity of PTSD symptoms relative to personnel on a waiting list (who received no treatment). These studies included several different forms of trauma including motor vehicle accidents, child sexual abuse, combat and mixed types of trauma. Comparisons exploring the effectiveness of group therapy from other active treatments (e.g., individual therapy) showed that group treatment was neither distinctively better nor worse. This suggests that although group treatment is better than no treatment, individual and group treatments are equally effective. There was also some evidence suggesting that group treatment was less effective for groups with more severe PTSD and repeated traumatization (Sloan et al., 2013). Moreover, as the authors of this meta-analysis noted, strong empirical studies with controlled methodologies are rare, and there is little or no information on exactly what is most effective for people with different types of trauma or from different backgrounds (Sloan et al., 2013). Despite the emphasis on family resilience within the U.S. Army, the DoD (2010) guidelines list family therapy as lacking any proven effectiveness at combatting PTSD.

4.3.4 Emerging Approaches

Obviously, efforts to find new and effective treatments for PTSD are ongoing. Our review of the literature showed two emerging treatments with the strongest preliminary evidence.

4.3.4.1 Web-Based Medicine

Using the World Wide Web to administer CBT treatment for PTSD is another option noted in the literature. This is cited as having many advantages (Foa et al., 2013), including overcoming being available to people in remote geographic areas, can be less costly, and provides relative anonymity for the people seeking services. This is noted to be of particular benefit when seeking treatment is stigmatized (e.g., military or police populations). Estimates for the cost-effectiveness of web-based therapy are that it offers cost saving (relative to face-to-face therapy) of between $540 and $630 per patient (Newman, Consoli & Taylor, 1999; cited in Foa et al., 2013). Moreover, there is good evidence of web-based therapies being effective with treating depression and anxiety (Kiropoulos et al., 2008; cited in Foa et al., 2013).

There is some existing research exploring the effectiveness of CBT administered over the Internet. Although apparently still at a relatively early stage, there is some evidence of both the ease and effectiveness of these web-based interventions. Because they are more simple, approaches using prolonged exposure are indicated as more feasible than some other CBT approaches that rely on more developed cognitive skills (e.g., cognitive restructuring). Moreover, having some type of direct therapist involvement does seem to improve the outcomes (Foa et al., 2013).

4.3.4.2 Telemedicine

Telemedicine (use of video-conferencing or telephone) is also evident in the literature as a possible way to treat PTSD. Telemedicine has been used in the U.S. with military veterans, and there is some proof of its effectiveness (Foa et al., 2013). Although there seem to be few highly controlled studies, one RCT has shown telemedicine to be just as effective as in-person therapy in treating anger in veterans with PTSD. Interestingly, Foa et al. (2013) make the point that perhaps comparing face-to-face treatment with telemedicine treatment may not be the best comparison, but that if even small effects could be seen (with a relatively cost-effective approach), a wider band of personnel who would not otherwise receive assistance could benefit.

4.3.4.3 Virtual Treatment

Virtual reality therapy (VRT) programs are also noted in the literature as an emerging approach to treating PTSD. Developed mostly over the past 15 years (Rizzo, Difede, Rothbaum, 2013), these programs integrate computer graphics and head-mounted visual displays as a tool to deliver prolonged exposure. VRT allows precise control over the presentation of immersive environments as well as allowing modelling of complex and engaging situations, and has shown its value in assisting people with anxiety disorders such as fear of flying, phobias, etc. (Rizzo et al., 2013). Given that one of the most effective treatments for PTSD has repeated been shown to be exposure therapy, it seems natural that there has been increasing use of VRT for treating PTSD. VRT is argued to offer re-presentation of difficult or traumatic stimuli to people who are "unwilling or unable to effectively visualize the traumatic event" (Rizzo et al., 2013, p. 6). As noted throughout the literature, avoidance of reminders and cues and dissociation from the event represent important symptoms of PTSD.

Cukor, Spitalnick, Difede, Rizzo, and Rothbaum (2009) argue that virtual reality (VR) enhanced exposure therapy has shown some success in reducing PTSD symptoms for 9/11 survivors and Iraq/Afghanistan war veterans. Cukor et al. also note that VR therapies, for war vets, could be promoted as a "high-tech" tool to help with "post-combat reintegration training," which could potentially reduce stigmatization and also appeal to younger patients who have grown up with gaming technology.

There is some evidence cited in the literature purporting to show the positive effects of virtual therapy with military personnel and first responders. Early research in 1997 using a Virtual Vietnam VR simulation showed some positive effects for one of the veterans for whom conventional PTSD treatments were not effective (Rothbaum et al., 2001; cited in Rizzo et al., 2013). VR was showed improvements in PTSD symptoms with people exposed to the 9/11 attacks (Difrede et al., 2001; cited in Rizzo et al., 2013).

Within the U.S., the Virtual Iraq/Afghanistan program is used to treat combat-related PTSD and consists of a series of virtual scenarios designed to simulate service members' experiences during deployment to Iraq or Afghanistan and serve as digital contexts for delivering prolonged exposure therapy (Rizzo et al., 2013). Results from somewhat uncontrolled research showed some positive effects (Rizzo et al.). This optimism obviously seems to have been embraced by PTSD treatment community, with about 55 military, veteran affairs and university clinic sites reported as using VRT treatment for PTSD.Even within the Canadian Forces, there is apparently increased interest in using virtual reality treatment to help soldiers diagnosed with PTSD (CBC News, 2012). This pilot project involves using virtual reality to exposure soldiers to a specific past traumatic event combined with working with a therapist once the memories have been retrieved.

Despite the apparent enthusiasm, however, the available research in support of the effectiveness of VRT as a treatment for PTSD is often based on case studies and studies without the appropriate control groups. This suggests that more stringent studies such as randomized controlled trials will be necessary to more firmly determine the value of VRT. However, Rizzo et al. (2013) indicates a current RCT exploring this is ongoing, so hopefully, more clarity will emerge.

Interestingly, some authors have noted that emerging treatments should be used when first-line treatments (e.g., prolonged exposure therapy, cognitive processing therapy) are not successful or require augmentation (Cukor et al. (2009).

4.3.4.4 Other

Within the available literature, a wide range of less common therapeutic techniques are noted. These include hypnosis, psychodynamic therapy (long term therapy that addresses a broad range of life issues), and imagery rehearsal therapy (DoD, 2010). However, although there is scattered evidence that these approaches can be somewhat effective, they are not empirically established. Given their nature, they seem less likely to be valuable to meet the pragmatic requirements of emergency responder domain.

4.3.5   Pharmacological Approaches

In terms of medication, the available research shows strong evidence supporting the effectiveness of medication for managing PTSD, with selective serotonin reuptake inhibitors (SSRIs; Stein, Ipser & McAnda, 2009) and selective norepinephrine reuptake inhibitors (SNRIs; DoD, 2010) having the strongest scientific support (based on more studies and large scale trials). The consistency of this conclusion throughout the research reviewed and the scientific quality of the studies cited in support of this conclusion show this finding to be very well grounded, as shown in Table 16.

Table 16: Pharmacotherapy Interventions (adapted from DoD, 2010, p. 149)

Treatment	Benefit vs. Harm	Scientific Status of Conclusion	Advice for First Responder/Receiver Community
SSRIs	Significant benefit	Strong scientific evidence, strongly recommended	✓✓✓✓✓ - definitely use – empirically supported
SNRIs	Significant benefit	Strong scientific evidence, strongly recommended	✓✓✓✓✓ - definitely use – empirically supported
Mirtazapine, Prazosin (for sleep/nightmares), Tricyclic antidepressants TCAs, Nefazodone (potential for drug-drug, drug-diet interactions**), MAOIs (phenelzeine)**	Some benefit	Fair evidence	✓✓ - recommended
Prazosin (global PTSD)	Unknown benefit	Some evidence but too close to determine	
Benzodiazepines*, Tiagabine, Guanfacine, Valproate, Topiramate, Risperidone	No benefit and POTENTIAL HARM	Not recommended	
Atypical antipsychotics (Except Risperidone), Conventional antipsychotics. Busiprome, Non-Benzodiazepine hypnotics.Bupropion, Trazodone (adjunctive).Gabapentin, Lamotrigine. Propranolol, Clonidine	Unknown benefit		Lacking evidence, benefits/harms undetermined

Note: * = potential harm; ** Caution for drug-to-drug and dietary interactions

Several drugs are noted as offering some benefit, and as having fair evidence of being effective (DoD, 2010). These include mirtazapine, prazosin (when used for sleep/nightmares), tricyclic antidepressants, nefazodone and monoamine oxidase inhibitors (MAOIs; e.g., phenelzeine). However, the use of prazosin for global PTSD is less established and of unknown benefit. Several drugs that are sometimes used to treat PTSD are not recommended, and in the case of benzodiazepineshave been shown to have the potential to create harm (DoD, 2010).

In general, then, the available evidence suggests that SSRIs and SNRIs are the most effective pharmacological treatment for PTSD. Interestingly, though, comparing the positive impacts of psychotherapeutic approaches with medicinal approaches suggests that psychotherapeutic approaches show bigger effect sizes (e.g., Keane et al., 2006). This is, in part, a reflection that research into psychotherapeutic approaches may be somewhat more developed.

4.3.6 Summary of Treatment after PTSD Diagnosis

The pattern of evidence as assessed within the U. S. Department of Defense (2010) guidelines and supported by our review of the available literature is shown in Table 17.

Table 17: Psychotherapy interventions (adapted from DoD, 2010, p. 24)

Treatment	Benefit vs. Harm	Scientific Status of Conclusion	Advice for First Responder/Receiver Community
Trauma-focused CBT (4-5 sessions; includes exposure therapy)	Significant benefit	Strong evidence	✓✓✓✓✓ - definitely use – empirically supported
Stress inoculation training	Some benefit	Some evidence	✓✓ - use – some empirical support
Patient education Imagery rehearsal therapy Psychodynamic therapy Hypnosis Relaxation techniques Group therapy	Some benefit	Inconclusive	Weak empirical base
Family therapy	Some benefit	Lacking evidence of benefit or harm	Some support but empirical base
Web-based CBT	Unknown benefit	Lacking evidence of benefit or harm	_

One of the challenges faced by the first responder/receiver community, then, is the extent to which the current treatment research can be generalized to their unique domain. Interestingly, there is some speculation noted in the literature that PTSD may have a unique profile in first responders, because stressors tend to be cumulative (Duckworth, 1986; Tolin, 1999; cited in Haugen et al., 2012). This account of PTSD seems to argue that repeated exposures may lessen the ability of first responders to cope with what they experience over time.

Moreover, first responders also function within contexts that somewhat uniquely bring other psychological factors into play, such as performance guilt. A study by Duckworth (1986) explored the impact of a fire disaster with 56 fatalities at a crowded soccer match in the U.K. A small fire at one end of the stadium quickly engulfed the stadium, leaving panicked crowd members trying to escape the smoke and flames while exits were jammed. The horror of the situation is more fully described in Duckworth (1986). This research studied the police officers responding to this situation. Among other things, this study showed the prominence of "performance guilt" in the officers, self-blame, doubts and a sense that they had failed to protect the people who died. Some indicated "If only I'd realized how it was going to develop, then I would have…". This description of what the officers faced seems a rather unique stressor faced by personnel within the emergency responder context. The sense of being responsible for the lives and well-being of others is simply a different kind of stress, and likely to have different implications for the development of PTSD.[21]

For the future, then, it will be important to validate the treatment best practices as being relevant to the emergency responder community.

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[21] This issue is discussed in more detail in the recommendations at the end of this report.

4.4   Diagnosing PTSD

PTSD is diagnosed by mental health professionals (e.g., psychiatrists) or physicians using one of the many tools available. Upon review of the literature, it is clear that the most common diagnostic tools for PTSD are the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993) and the Clinician Administered PTSD Scale (CAPS; Blake, Weathers, Nagy, Kaloupek, Gusman, Charney, & Keane, 1995).These two measures and other less common measuresare described in the section that follows.

4.4.1   The PTSD Checklist (PCL)

The PCL (Weathers et al., 1993) is a self-report measure comprising 17 items using a Likert-type scale. It is designed to measure PTSD symptomology within the last 30 days. Weathers and colleagues made three different versions which differ on the type of trauma to which the patient has been exposed.

> **Civilian Version** - The Civilian version is used for civilians who have repeated exposure to trauma. The Civilian version is the most appropriate for first responders, given that they are not exposed to combat-related trauma but are repeatedly exposed to other types of traumatic situations. There are many studies that investigate PTSD in first responders using the PCL-C (e.g., Berninger et al., 2010; Corrigan, McWilliams, Kelly, Niles, Cammarata, Jones et al., 2009; Lafauci Schutt & Marotta, 2011, Meyer et al., 2012; Perrin, DiGrande, Wheeler, Thorpe, Farfel, & Brackbill, 2007). The Civilian version is the most generalized and can be used for essentially anyone who exhibits PTSD symptoms. Some studies, although few, use the Civilian version even for Military patients (e.g., Smith, Wingard, Ryan, Kritz, Silverstein, Slymen, & Sallis, 2009.)

> **Military Version** - The Military version was created specifically to investigate combat-related PTSD in troops and veterans. Nearly all studies that investigate PTSD using the PCL in a military-related sample use the Military version (e.g., Elhai, Contractor, Palmieri, Forbes. & Richardson, 2011; Lande et al., 2011; Renshaw, 2011; Richardson et al., 2011).

> **Specific-Trauma Version** - The Specific version can be used on any population but is geared toward a specific traumatic event that the individual experienced; for example, a civilian who witnessed the Boston Marathon Bombings of 2013.

All versions of the PCL have excellent reliability and validity despite being solely dependent on self-report. The PCL is often used in conjunction with the CAPS, but is also often used on its own as it is an efficient tool when time is limited; the PCL (all versions) takes a maximum of 10 minutes to complete, while the CAPS can take up to a full hour.

The PCL asks participants to indicate, "How much you have been bothered by that problem in the past month". The Likert-type scale responses range from 1 ("Not at all") to 5 ("Extremely").

- Repeated, disturbing memories, thoughts, or images of a stressful experience from the past.
- Suddenly acting or feeling as if a stressful experience were happening again.
- Avoid activities or situations because they remind you of a stressful experience from the past.
- Feeling emotionally numb or being unable to have loving feelings for those close to you.
- Being "super alert" or watchful on guard.

PCL scores are summed, which means scores can range between 17 and 85; a cut-off of 50 is an acceptable predictor of PTSD (Australian Centre for Posttraumatic Mental Health, no date).

4.4.2   The Clinician-Administered PTSD Scale (CAPS)

The CAPS (Blake et al., 1995), despite its lengthy administration, is a common, reliable, and valid tool for assessing PTSD (see Weathers, Keane, & Davidson, 2001 for a review). Nearly all studies reviewed that assess PTSD via interview method follow the 30-item CAPS protocol. Unlike the PCL, there is only one current version of the CAPS, and it has shown to be reliable and valid across many populations,

including military (e.g., Forbes, Fletcher, Phelps, Wade, Creamer, & O'Donnell, 2013; Richardson et al., 2011; Carson, Paulus, Lasko, Metzger, Wolfe, Orr, & Pitman, 2000) and first responders (e.g., Cukor et al., 2010; Meyer et al., 2012)

The CAPS is a comprehensive interview for assessing PTSD because it investigates both frequency and intensity of PTSD symptoms, which allows for specific "fine-grained analysis of symptom severity" (Blake et al., 1995, p.78). Just like the PCL, it measures symptomology within the past 30 days.

The CAPS is an extensive interview protocol. The questions range from those requiring "yes/no" responses to Likert-type scale responses, but also require that respondents describe their responses in more detail. At the beginning, the CAPS requires the clinician to ask the respondent, "What happened?" with regard to the traumatic event. Further probing questions include:

- How old were you?
- Who else was involved?
- How many times did this happen?
- Was it life threatening?
- How did you respond emotionally?
- Have you ever had unpleasant dreams about the event?
- Have you had difficulty remembering some important parts of the event?

A more detailed description of the CAPS and its analysis can be found in Blake et al., 1995.

The CAPS and PCL are often used together when measuring PTSD because they yield strong correlations with each other. One notable study that used both the PCL and the CAPS was from Cukor, Wyka, Mello, Olden, Jayasinghe, Roberts, et al. (2011), who investigated a large sample of World Trade Centre disaster workers following the attacks of September 11, 2011. Their study was longitudinal and measured not only initial PTSD, but also PTSD at 4 and 6 years following the disaster. The study is a great example for utilizing both the PCL and CAPS for investigating PTSD in first responders. Finally, the availability of the PCL and CAPS scales makes them very appealing to clinicians and researchers. Both scales are readily available, at no charge, from the National Center for PTSD (Elhai, Gray, Kashdin, & Franklin, 2005).

Prominent measures for diagnosing PTSD likely to be helpful within the emergency responder context are shown in Table 18.

Table 18: Prominent measures for diagnosing PTSD

Measure	# of Items	Type/ Time	Reliability/ Validity Evidence	Additional Notes	Recommended for First Responders
PTSD Checklist (Civilian, military and specific versions; PCL-C; Weathers et al., 1993)*	17	Self-report/ 10 mins	High/ High	Most common diagnostic tool. Available in several languages.	✓
Clinician Administered PTSD Scale (CAPS; Blake et al., 1995)*	30	Clinician given/ 1 hr	High/ High	Common non-self-report diagnostic tool. Initial version created by Blake et al., 1990 (CAPS-1) within the VA National Center for PTSD.	✓
*Full scale obtained and available.					

The PCL and CAPS are by no means the only diagnostic tools for assessing PTSD. The Davidson Trauma Scale (DTS; Davidson et al., 1997) is a self-report diagnostic scale that measures both severity and frequency of PTSD symptoms. The DTS is comprised of 17 items roughly divided between the PTSD symptoms of intrusive-experiencing, avoidance and numbness, and hyper-arousal. It measures both severity and frequency of symptoms within the past week. Unique to this scale is that the three subscales can be assessed separately (Davidson et al., 1997) The SPAN screening tool discussed above is a derivative of the DTS. While not as popular as the PCL, the DTS was found in several studies reviewed and consistently indicated good reliability and validity (e.g., Calhoun et al., 2010; McDonald, Beckham, Morey, & Calhoun, 2009; Zlotnick, Zakriski, Shea, Costello, Begin, Pearlstein, & Simpson, 1996). The majority of studies that use the DTS are those that focus on pharmacological approaches to trauma symptomology (e.g., Hidalgo& Davidson, 2000; Tucker, Zaninelli, Yehuda, Ruggiero, Dillingham, & Pitts, 2001; Davidson, 2006).

In general, however, the PCL and the CAPS are the most promising tools for the emergency responder domain.

4.5   Chapter 4 – Take Home Messages

Several key conclusions emerge from the body of research reviewed in this chapter, as follows:

4.5.1   Emergency responder treatment research is not adequately developed

Unfortunately, there is not enough research from the emergency responder domain to allow confident evidence-based conclusions about how to help personnel affected by traumatic stress. The implication of this is that it will be necessary to rely on other domains such as the military literature until future research helps to close this current gap. This issue is discussed in more detail in the chapter that follows.

4.5.2   Personnel exposed to traumatic stress should be assessed immediately

Best practice guidelines emphasize the need for personnel who experience traumatic stress to be informally assessed within the first 4 days. This assessment should explore whether there are any serious concerns or behaviours (e.g., danger to self or others) and then to ensure that basic needs are met. Although current guidelines do not explore exactly who should be doing this assessment, presumably the responsibility would fall to team leaders/supervisors and/or assigned peers to make sure that the exposed member is supported and that any grave concerns are acted upon.

4.5.3   PTSD can only be formally diagnosed by trained professionals

Although stress-related symptoms can be detected by anyone close to affected personnel, only trained professionals can make a diagnosis of PTSD. Ideally, this diagnosis is done using reliable and valid scales specifically developed for this purpose. The two most common scales in the literature that are likely to be useful in the emergency responder context are the PTSD Checklist (PCL) and the Clinician-Administered PTSD Scale (CAPS).

4.5.4   Personnel showing symptoms should be treated with CBT

Quick action to help personnel struggling with traumatic stress within the first 30 days (i.e., before diagnosis of PTSD) and after PTSD has been diagnosed is critical to lessening the impact of the stress. The literature clearly showed cognitive behaviour therapy as the most effective treatment. Other supports such as psychological first aid, education and normalization and encouraging social supports can also be used but strong evidence of their efficacy is still lacking. In our view, using stress inoculation training for reducing PTSD has not been adequately supported by relevant research.

4.5.5   Personnel NOT showing signs of traumatic stress should NOT be treated

In general, if personnel are not showing any signs of traumatic stress, do not attempt to treat them with formal therapies. However, informal therapies such as generic education and training are fine.

4.5.6   Psychological debriefing should NOT be used

There is strong consensus in the available literature that psychological debriefing should not be used and could be harmful.

4.5.7   Personnel experiencing traumatic stress should receive both formal and informal supports

Ideally, prevention and treatment approaches need to provide a continuum of care, from professional (e.g., mental health supports/EAP) to informal (e.g., peer, family) supports.

4.5.8   Pharmacological treatment of PTSD can help to reduce symptoms

There is agreement in the available literature on the efficacy of SSRIs and SNRIs. Other medications have also shown some benefits, but there are some cautions around the use of some medication for treating PTSD noted in the literature.

5. Taxonomy for Future Research and Actions Required

To this point, this review has aimed to identify research and best practices about managing PTSD (and traumatic stress) that might be relevant to the emergency responder community.

Another key goal of this review was to identify what research could be done to support the first responder/receiver community to deal with PTSD. In our view, the critical next step should involve working with the emergency responder community to understand PTSD from their perspective, rather than from the primarily military perspective of much of the research used in this report. Even though military personnel and emergency responders both work in high risk environments, the uniqueness of the stresses within each context should not be underestimated.

More generally, this chapter briefly outlines some broad actions required by the emergency responder community as it refines its approach to managing traumatic stress and PTSD. Following this, specific ideas for research supporting this shift are indicated.

5.1 Broad Requirements for the Emergency Responder Community

5.1.1 Work to create the culture necessary to manage PTSD effectively

A key challenge for the emergency responder community is creating the environment and conditions necessary for personnel who require help to be able and willing to get the assistance that they need. The available literature showed a persistent theme; namely, that suffering from traumatic stress can be alienating from one's peers, can be subject to scorn and ridicule and that organizational systems sometimes (quite unintentionally) disadvantage personnel who are willing to admit that they are experiencing the negative impact of traumatic stress.

For the emergency responder community, this suggests that efforts to promote better management of PTSD will require attention and thought around the issue of what the current culture is, and how this culture can move toward being fully supportive of traumatic stress injuries. The issue of culture change is a massive topic on its own and is worthy of a literature review in its own right (e.g., Levin& Gottlieb, 2009). The key, we would argue, is honest recognition of the current culture around PTSD, identification of whether it is fully open to discussing and managing issues of PTSD and addressing any possible impediments before efforts to move forward begin.

For example, military systems, with their warrior ethos and resistance to admitting weakness, have struggled to improve their culture around traumatic stress injuries. But, as they have grappled to deal more effectively with traumatic stress, they have met resistance from their own members. For example, our experiences with military personnel have shown that some see PTSD as a crutch used by weak and unmotivated members to avoid work. Of course, these attitudes do grave disservice to the many hardworking but traumatized people who suffer from job-related PTSD. However, the Canadian Forces has worked to incrementally displace the myths with accurate information and to slowly shift the cultural ethos of the CF to one in which the impacts of traumatic stress are better understood and accepted. In recent years, for example, the Canadian Forces has been working to better support operational stress injuries (OSI), to raise both the profile of the problem as well as to attempt to decrease the stigmatization often associated with stress-related injuries. An increased number of operational stress injury clinics funded by Veterans Affairs, and increased discussion about the issue throughout the military literature (e.g., English, 2012) are evidence of greater recognition of the problem and efforts to address it.

The emergency responder community may also benefit from similar efforts to bring PTSD more into the limelight and to either resume or start discussions that promote acceptance of the personnel who suffer from traumatic stress. If there is currently a culture of silence around PTSD, it is critical for the emergency responder community to begin to push for more dialogue and for leaders within the system to publicly endorse the issue as an important one that needs to be addressed.

An important part of this cultural shift from a research perspective may involve working to garner more acceptance of the need for evidence-based practice (Foa et al., 2013). It is easy to see evidence-based treatment as too "academic" or strict, and for people outside of the scientific community to see rigorous methods as unnecessary or overkill. Indeed, personnel within some systems (such as the military) are sometimes more comfortable relying on anecdotal reports of what might be effective or on their own intuitions. Moreover, our review of the literature showed a tendency for "bandwagoning", for someone to identify a promising treatment (e.g., psychological debriefing) and for others to "jump on board" without a critical assessment of the accuracy of the claims. Instituting better practices will require scientists to make a strong case for the value of evidence-based treatment and practice for PTSD.

5.1.2   Create coherent policies and procedures around managing traumatic stress and PTSD

As highlighted throughout this report, protecting personnel will require a discrete and targeted recognition of traumatic stress and a willingness to address the problem directly at a systemic and organizational level. This will require creating a full set of policies and procedures that fully describe what PTSD is, and how it will be managed at an organizational level, right down to how personnel will be supported. We would argue that this process needs to be informed by the best practices currently available in the literature, but only after being validated for the emergency responder community. This issue is addressed in more detail in Section 5.2.2.

Unfortunately, the creation of more integrated policies and procedures for managing traumatic stress within organizations may be more difficult within the emergency responder community, at least partly due to more limited resources. Haugen et al. (2012) argue that unlike the large military systems (e.g., with infrastructures supporting veterans), first responders may lack the funding and organizational structures needed to support personnel experiencing problems with traumatic stress. Moreover, even though military systems like the CF have personnel spread throughout Canada (and indeed the world), they also have more critical mass with each subsystem to at least potentially make service delivery and implementation more feasible and cost-effective. Whatever the challenges, however, the emergency responder community needs to work to create both strong policies and systems to support personnel suffering from traumatic stress.

5.1.3   Find traumatic stress experts who can help

From the perspective of better managing PTSD a clear challenge is that the most effective current treatments (e.g., CBT) need to be administered by trained professionals. Relying on professionals rather than on support provided by one's peers is certainly likely to be more expensive, but the additional costs of CBT may not be the most serious impediment. Personnel within many high risk workplaces (e.g., military) often seem to prefer to handle difficulties or challenges within their own unique communities with the support of their close peers and leaders rather than to allow "outsiders" to permeate their systems. Within the policing domain, for example, the term "blue wall" (i.e., the protective secrecy that functions as an unwritten code amongst police officers that functionally divides them off from other non-police officers) seems to underscore this tendency. Given the pressures faced by personnel in high risk environments, outside professionals are sometimes seen to be less credible and as less likely to truly understand the demands faced by personnel within the system. Accordingly, the advice given by less credible helpers may be less likely to be respected and heeded than advice from a leader or peer. These attitudes could damage the therapeutic benefits that could be gained.

In the longer term, then, professionals helping emergency responders to manage traumatic stress need to be allowed to be close enough to the "inner circle" to be effective. This may run counter to the ethos and culture of the first responder community, who may prefer to "care for their own". The reality is that the best and most effective treatments for CBT are more than just "common sense" that can be easily picked up. Just as firefighters would not feel comfortable asking untrained civilian witnesses to be directly engaged in fighting a fire, trained psychologists and mental health professionals feel no less concerned about the prospect of non-mental health professionals being involved in treating personnel suffering serious psychological trauma. The advanced training and knowledge necessary to truly protect and support a traumatized person should also not be trivialized as being less important than the highly developed skill of fighting a fire or delivering medical care. For the first responder/receiver community, then, the ideal might be to work toward finding CBT providers who have the skills and motivation to help and then working truly collaboratively with them to develop the best possible systems of treatment.

5.2 Research Supporting the Broad Requirements

The sections that follow describe possible research approaches to help the emergency responder community manage the traumatic stress and PTSD.

5.2.1 Baseline scan of emergency responder PTSD practices and services

Moving forward, grappling with the challenge of promoting better PTSD-related practices within the first responder/receiver community will require a clear understanding of the current "as-is" within this diverse community. It seems important not to assume either that the PTSD-related needs are similar, or that the current approaches within the different subsystems (e.g., police, firefighters, paramedics, nurses, physicians etc.) are common. As such, a "baseline" scan or inventory of current practices and treatment approaches might be helpful. This scan could help to answer the following questions:

- How is PTSD defined within each first responder/receiver organization?
- Are there preventative approaches (e.g., education, training) to help prepare personnel?
- What is the type and frequency of stress-related screening? What tools are used?
- What PTSD-related guidelines are they currently following?
- What treatment options are available for personnel diagnosed with PTSD?
- What informal support systems exist that might buffer the impact of trauma-related stress?
- What is the current culture around traumatic stress within each organization?
- What policies and procedures guide the approach to PTSD within each organization?
- What services models are used to manage PTSD?
- What is the current education/training approach for managing traumatic stress?
- What education/resource materials about traumatic stress are available to personnel?

A key issue to understand is how the organizations that first responders/receivers serve actually support and respond to personnel who are struggling with traumatic stress. One important issue, of course, is how leadership explicitly responds to the issue of PTSD. If they label it as indicating weakness or as indicating a poor work ethic, this could deter other personnel from acknowledging that they are also struggling. Whether stemming from negative leadership attitudes or organizational practices, if there are negative job impacts (e.g., no promotions, lack of flexibility), there may be little incentive to personnel reporting the challenges that they are faced in managing stress.

These research questions, then, are relevant to the sections that follow that explore further areas of research required to better understand PTSD in the emergency responder community.

5.2.2   Validate the "best practice" guidelines with PTSD experts

This review of the literature relies on research that was the best available (e.g., up-to-date and scientifically strong). However, any "best practices" identified within this report derive from the literature rather than being informed by strong subject matter expertise. Given the serious implications of treating personnel with traumatic stress, it will be critical to validate the best practices identified herein with PTSD experts. These guidelines should not be implemented in any way unless and until they are closely examined and identified as safe and accurate treatments for PTSD based on the best available scientific knowledge. Given the time lag between when effective treatments are identified and thoroughly disseminated in the literature, it is also important to ensure that the best practices accessed for this review are still relevant to the treatment of traumatic stress today. Pragmatically, this step would require bringing together a group of trained clinicians and mental health professionals working within the PTSD field in Canada and/or the U.S. for a workshop and/or focus groups and asking for their input, agreement, and additional guidance on the key points of this review.

Moreover, given the sheer scope of this review, additional details about the specifics of PTSD prevention and treatment could not be covered adequately. As such, additional relevant information could still be gleaned from existing resources as well.

5.2.3   Scan PTSD practices and services as implemented in other contexts

As the limited resources of this review required relying only on the available written literature, future research should explore not just the written practices and guidelines, but how these practices have been instantiated within complex systems that expose personnel to high risk (e.g., military). This could include issues like what service models are currently used, and how funding structures work. For example, within the literature reviewed, we saw evidence of different ways of structuring PTSD services. This scan could potentially help to validate the tentative conclusions reached in this report, as well as to highlight areas in which practices and approaches that have been effective in other settings would need to be different for the first responder/receiver community.

This scan should also investigate different treatment models for managing traumatic stress. One innovative approach noted was incorporation of traumatic stress treatment into the primary care setting rather than within a more conventional mental health clinic (Cigrang, Raunch, Aliva, Bryan, Goodie et al., 2011). Based on past research (Hoge et al., 2004; cited in Cigrang, Raunch, Aliva, Bryan, Goodie et al., 2011) showing that military personnel most in need of help for traumatic stress were also reluctant to get help because of stigma, this research explored treatment that was incorporated in a primary health care setting, using a model called the Primary Care Behavioral Health Model. This model aims to provide an integrated approach to addressing both medical and psychological concerns. As the emergency responder community moves forward, it would be helpful to investigate some of the existing structures and support systems in related areas. More broadly, then, it may be helpful at the start of research to produce a clear "lay of the land" in terms of how other complex organizations and systems have worked to implement the best practice guidelines that have emerged in recent years and to benefit from their experiences as well as to learn from their mistakes. Within the first responder/receiver community, as policies and procedures may be at an early stage of development, there may be an opportunity to systematically adopt and implement only evidence-based approaches and treatments.

5.2.4   Evaluate efficacy of prevention efforts (e.g., education, selection)

Although the available literature offers some relevant information about how traumatic stress should be managed within the first 30 days after exposure, the current advice is not strongly empirically supported. This should be a focus of future research, as to the value of psychological first aid vs. education and training. Of course, one of the possible impediments to this research is that given the complexity and cost of PTSD, resources that go toward treating traumatic stress once it is clearly problematic (i.e., after a

diagnosis of PTSD) are likely to be given more priority than approaches that are simply preventative in nature. However, at an organizational level, this is only an ideal approach if the costs of waiting for PTSD to happen before treating it are actually lower than the cost of preventative interventions like education and resilience training.

As noted earlier in the review, the true benefits of prevention efforts are not currently well known. This suggests that future research could explore the value of prevention for helping to manage traumatic stress. For example, this could include research exploring whether preventative training has any actual benefit at reducing stress-related challenges or whether careful selection of more "hardy" and resilience personnel might predict their ability to perform in highly stressful situations in the long-term.

5.2.5 Screening and diagnostic tools

This review identified two common screening tools with good scientific properties that would need to be assessed for acceptability by the first responder/receiver community. Current tools should be evaluated in terms of their tone/wording and their ability to speak to the unique issues faced by first responders/receivers. This would require both discussions with members of the community to get their impressions of these tools, as well as actual data collection that would work to understand the reliability and validity of the tools when used within the first responder/receiver community.

The available literature showed some promise of offering tools that might help both leaders and other personnel to better educate themselves about what traumatic stress and PTSD actually look like. As described earlier in this report, a tool developed in research conducted for the Canadian Forces seems to show some promise of being easily understood and pragmatically applied, as shown in Figure 9.
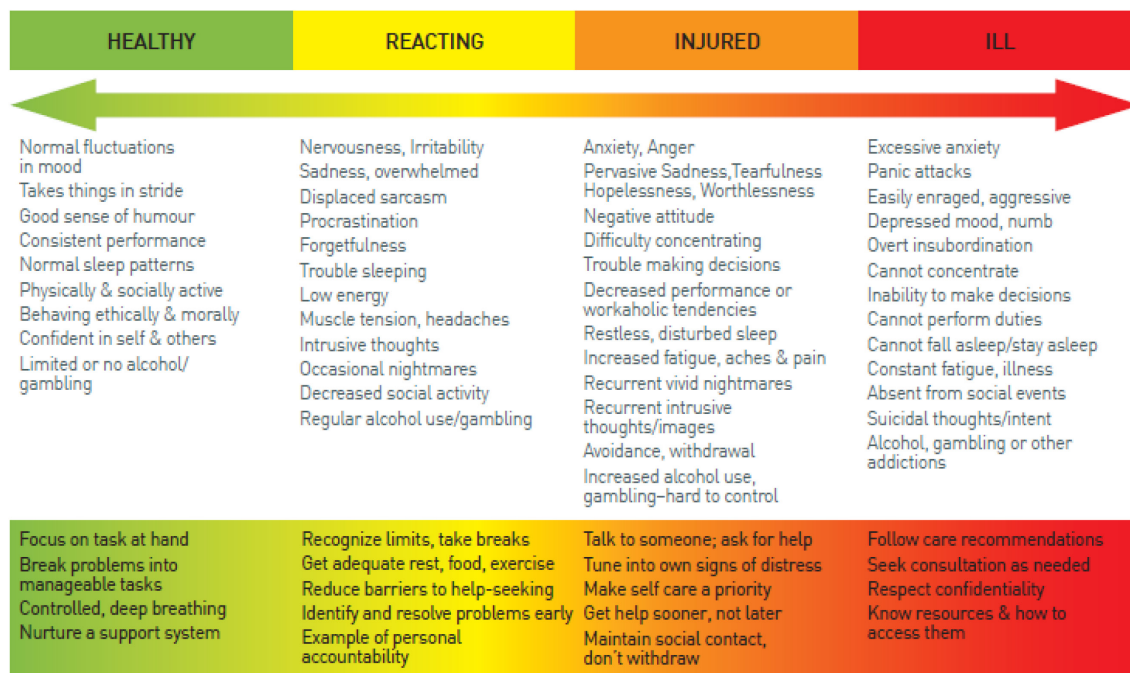
Figure 9: Mental Health Continuum Model (DND, 2010, p.5*)*

This graphic shows an easy-to-use tool that (if validated with first responders) could be a very helpful way to aid identification of personnel at risk of developing traumatic stress injuries.

It may also be necessary to create new tools that are specific to the emergency responder community. For example, in light of some of the "knowns" in the current literature, it might be helpful to work to create a diagnostic tool that helps to quantify the levels of traumatic stress likely to be associated with particular

types of trauma. This, combined with tracking of the trauma to which personnel are exposed, could provide insight into when personnel might be at high levels of risk for being affected by traumatic stress.

5.2.6 Evaluate efficacy of PTSD treatments

Given the current gaps in knowledge identified earlier in this review, conducting or supporting strong scientific research that helps to inform evidence-based PTSD treatment is perhaps the most important priority of future research. As noted earlier, since the current body of knowledge within the emergency responder community is currently inadequate, perhaps the only available approach for now is using current treatment guidelines from other domains (e.g., CBT), and work to validate these treatments with first responders/receivers.

Knowing the potentially negative effects that PTSD can have on peoples' lives, then, it is discouraging that many current efforts are not guided by strong scientific research. Therefore, what is required within the PTSD community is a concerted effort to design strong and tightly controlled scientific studies (i.e. randomized controlled trials) that can more precisely show the true effects of treatment. Unfortunately, these types of studies are currently relatively rare within the emergency responder community, but progress will hopefully be made on this issue in the future.

A recent U.S. report by Institute of Medicine (2012, p. 13) emphasizes the importance of working toward a strong empirical base, by advocating that assessment data should be collected before, during and after treatment to assess the effectiveness of the treatment and research should be ongoing with regard to their efficacy. One key requirement for the community, then, is starting to create a strong system of tracking, treatment (and its effectiveness) and outcomes in order to help guide its efforts.

As the community moves forward in its plan to address PTSD, an important consideration will be how well various treatment approaches will mesh with the prevailing culture. For example, our experience is that first responders/receivers are pragmatic and goal-directed and may not be amenable to approaches that they perceive to be "airy-fairy". In this sense, CBT seems to be a logical alternative because it is very focused, and has been argued to likely resonate more with first responders because it requires a directive and active stance (Haugen et al., 2013) on the part of patients.

Based on the current literature, this area is still very much under development and moving this area of research forward would require consideration of the following issues:

- Do currently available treatments for PTSD match the requirements of the first responder/receiver community?
- Are current treatment models accepted by the community?
- What forms of treatment for PTSD are currently used within the first responder/receiver communities?
- How can information about the effectiveness of various treatments be best disseminated?

5.2.6.1 Target most promising treatments

Obviously, given the many possible treatment alternatives, it will be impossible to understand the effectiveness of every form of treatment. As such, it will be necessary to clearly and deliberately form and test the research questions that are most critical to the emergency responder community.

5.2.6.2 Emerging treatments

Managing PTSD within the first responder/receiver context presents a number of unique challenges, such as personnel who are widely geographically distributed and the need for cost-effective treatment. Given these challenges, it might be advisable to devote some attention to examining the efficacy of treatments

that are simultaneously noted to be promising, in part because they might help address some of the current challenges within the emergency responder community. For example,fully implementing a support system for managing PTSD within the emergency responder community will require addressing barriers related to accessibility. These may be overcome with the use of emerging technologies such as mobile, telemedicine, Internet-based treatment, and virtual reality. However, given that these treatments are at the early stage of development, additional research will be required to understand their efficacy.

5.2.7   Cost/benefit analyses

A key point made in assessing the treatment literature around PTSD is that it is important to consider both the positive impacts of treatment as well as the negative impacts (e.g., the potential for harm). Responding more actively and proactively to PTSD could prove to be much costly for the emergency responder community. However, these costs need to be contrasted with the potential cost of <u>failing</u> to respond adequately. Based on some available literature in other areas, the costs of failing to respond are actually higher than actually responding, at least within some systems.

For example, some analyses done within the U.S. military system in conjunction with the U.S. involvement in Iraq and Afghanistan show the costs of PTSD and the benefits of treating it effectively. Previous research estimated the probable cost of PTSD in terms of "lost productivity, mental health treatment and suicides" (Foa et al., 2013, p. 67) during a 2-year period would be about $925 million, whereas using evidence-based treatments would save about $138 million (approximately 15%; Kilmer, Eibner, Ringel & Pacula; cited in Foa et al., 2013). Another study (Tanielian & Jaycox, 2008; cited in Foa et al., 2013) estimated that treating 100% of military personnel who needed care for PTSD and depression could result in savings of $1.7 billion (or $1063 for each returning veteran).

Presumably, one of the challenges for the emergency responder community responding more proactively to the challenge of traumatic stress will be securing the necessary resources to fund evidence-based proactive approaches rather than the more hidden personal, organizational and societal costs of PTSD (e.g., higher rates of long and short-term disability, higher rates of job turnover, higher suicide rates). A logical next step, then, might be to more fully document the potential costs and the potential benefits and to find some way to conduct a cost/benefit analysis that objectively examines both sides of the issue. Given that emergency responders who are debilitated by traumatic stress in some way would need to be supported at one or all of the levels of government (e.g., local, provincial and federal levels), it would seem illogical for all of the systems that would be involved in supporting personnel suffering from traumatic stress to be uninterested in an approach that could offer substantial cost saving if a clear argument could be made. This suggests that working to perform a cost/benefit analysis might be a logical step for the first responder/receiver community to undertake as a way of at least understanding both the costs and the benefits of more active responses to traumatic stress within the people who serve.

5.2.8   Additional research ideas

Our review of the available literature showed several additional topics as potentially important to consider. These are presented in the sections that follow.

5.2.8.1 Focus on first receivers and PTSD

Although the scope of this review included both first responders and first receivers, the available research is focused overwhelmingly on first responders, with relatively attention being devoted to PTSD in first receivers. Given the accumulating evidence and changes in the definition of PTSD to include trauma occurring as the result of more indirect contact with traumatic stressors, it seems important for the issue of PTSD in first receivers to receive more attention as this literature continues to develop. This could include research with specific focus on first receivers, through interviews and/or focus groups with frontline medical personnel.

5.2.8.2 Analyze optimal levels of exposure to trauma

Given the nature of the work that emergency responders undertake, a critical question that needs to be more fully addressed is: exactly how much trauma and stress is too much? If (as the literature suggests) traumatic stress is cumulative, a key question is what the maximum levels of exposure might be. Future research should be directed at a better understanding of this question.

5.2.8.3 Identify at-risk personnel

Another notable gap in the literature relates to identification of at-risk personnel.

> *"One key research gap is the limited ability to identify people who are at high risk of developing PTSD; this problem clearly influences what healthcare providers might (or might not) do. Thus, development of a robust clinical prediction rule that can be used to identify which recent trauma victims are at high risk of developing PTSD is an urgent need." (Forneris et al., 2013, p. 648)*

This sentiment is also echoed by other PTSD researchers (Feldner et al., 2007), who indicate the need for better identifying people who are at high risk for PTSD. They indicate the potential for biological indicators of susceptibility to stress to help make this determination. Future research that helps to identify personnel at high risk of PTSD is an important priority.

5.2.8.4 Tailor awareness/education materials

Once the previous research activities are complete, it seems important to make a concerted effort to transmit what is done about PTSD relevant to emergency responders. This could involve a very simple project of taking the core materials (e.g., what to look for to assess PTSD, how to address traumatic stress at different time intervals) and tailoring them to be maximally relevant to the community. Following this, testing the effectiveness of these materials with members of the community would be critical, as it is important to ensure that the necessary messages are clearly and effectively communicated.

5.3 Conclusion

Organizations required exposing their personnel to high levels of risk and potential trauma need to work to create a culture of acceptance around the traumatic stress continuum and to work to provide a safe and supportive place for personnel to work through their natural reactions to traumatic exposure. Although the emergency responder community has always faced issues of traumatic stress and PTSD, the development and progression of the body of knowledge has promoted increased awareness around the costs and dangers of traumatic stress. Organizations are now expected to deal proactively and genuinely to provide the supports necessary to help their personnel cope with the stresses that they face. Moreover, there is also mounting evidence that proactive rather than reactive management may be both more effective and more economical. This review is a signal of the increased interest and concern about PTSD within the emergency responder community and will hopefully contribute to further planning, conversation, and the use of evidence-based treatment that will protect and support emergency responders from traumatic stress and PTSD.

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13.   ABSTRACT

    This report aims to inform the emergency responder community about Post Traumatic Stress Disorder (PTSD). Given that the available literature within the emergency responder community is very limited, this review relies on the military and scientific literature to explore the issue of traumatic stress and PTSD. This review focused on the following four questions:

- How should PTSD be defined, recognized and how often does it occur?
- How can traumatic stress and PTSD be prevented?
- How should traumatic stress and PTSD be treated?
- What research could support management of PTSD in the emergency responder community?

PTSD is a fully developed form of traumatic stress that is only diagnosed after experiencing symptoms for at least a month. PTSD occurs when symptoms evolve in the aftermath of an extreme traumatic stressor that overwhelms an individual's coping capacities. PTSD is a serious and potentially debilitating illness. As such, it needs to be managed effectively using established and validated treatments and tools. Deliberate efforts to manage traumatic stress are critical, particularly for organizations that require their personnel to be exposed to high-risk, traumatic situations. This review concludes with a discussion of research priorities for the emergency responder community to manage PTSD in a more systematic way.

Le présent rapport vise à fournir à la communauté des intervenants d'urgence des renseignements au sujet du trouble de stress post-traumatique (TSPT). Étant donné que les intervenants d'urgence disposent de très peu de documentation sur le traumatisme dû au stress et le TSPT, le rapport s'appuie sur la documentation militaire et scientifique. L'examen a porté sur les quatre questions suivantes :

•   De quelle façon le TSPT devrait-il être défini et reconnu, et quelle est sa prévalence?

•   Comment peut-on prévenir le traumatisme dû au stress et le TSPT?

•   Comment devrait-on traiter le traumatisme dû au stress et le TSPT?

•   Quelles recherches pourraient appuyer la prise en charge du TSPT par la communauté des intervenants d'urgence?

Le TSPT est une forme de traumatisme dû au stress ayant atteint un stade avancé, et il peut seulement être diagnostiquée chez des personnes qui présentent des symptômes depuis au moins un mois. Le TSPT se manifeste lorsque les symptômes évoluent à la suite d'un événement exceptionnellement traumatisant qui inhibe les capacités d'adaptation d'une personne. Le TSPT est une maladie grave et potentiellement invalidante. Ainsi, il doit être pris en charge efficacement à l'aide de traitements et d'outils établis et validés. Il est crucial que des efforts délibérés soient déployés pour prendre en charge le traumatisme dû au stress, en particulier au sein des organisations dont le personnel doit être exposé à des situations à risque élevé et traumatisantes. Le rapport se conclut avec une analyse des priorités en ce qui concerne les travaux de recherche à mener pour assurer une prise en charge plus systématique du TSPT par les intervenants d'urgence.

14.   KEYWORDS, DESCRIPTORS or IDENTIFIERS
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