

Part I

Introduction

Chapter

1

Individual and Community Responses to Disasters

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Disasters affect millions of people worldwide. Increasing frequency of disasters and increasing population density suggest that greater numbers of people will be affected by disasters (Goldmann & Galea, 2014). Between 1994 and 2013, an estimated 6,873 natural disasters occurred worldwide, affecting an average of 218 million people annually, with an estimated average of 68,000 lives lost per year (Centre for Research on the Epidemiology of Disasters [CRED], 2015). Examples include the 2015 floods in Haiti, the 2011 Great East Japan Earthquake, the 2011 Christchurch earthquake in New Zealand, the 2009 Black Saturday bushfires in Australia, Hurricane Katrina in Louisiana, 2005, and the Asian tsunami of 2004. Population growth and development in high-risk areas such as earthquake zones puts greater numbers of people at risk for disaster exposure (CRED, 2015). Climate-related disasters have increased globally, averaging an estimated 341 annually since 2000, up 44% from the 1994–2000 annual average of 240, and more than twice the amount from 1980–1989 (140 annually) (CRED, 2015).

Terrorist events have increased globally by 80% from 2013–2014, with 32,658 lives lost due to terrorism in 2014, representing the largest annual increase in 15 years (Institute for Economics & Peace, 2015). Over the past few decades, terrorist acts of mass killing have become more frequent, receiving substantial media coverage and public attention (Lowe & Galea, 2015). Examples include the September 11 (9/11) World Trade Center attacks; the recent bombings in Paris, at the Boston Marathon, and in a government building in Oslo; mass shootings in San Bernardino, California, at a movie theater in Aurora, Colorado, and at a camp in Utoya, Norway; school shootings in Newton, Connecticut, Winnenden, Germany, Kuahajoki, Finland, and Virginia Polytechnic Institute (Virginia Tech); and the ongoing terrorist attacks in the Middle East.

In addition, there are at least 23 ongoing wars (http://en.wikipedia.org/wiki/Ongoing_wars), with mass casualties, famine, and community devastation involving an estimated 40 countries (<http://www.globalsecurity.org>). Worldwide in the year 2000, more than 300,000 people died from war (World Health Organization [WHO], 2001). Nuclear disasters (e.g., Fukushima and Chernobyl) precipitate psychological and medical issues related to fear of exposure and contamination that can place an additional burden on medical resources (e.g., large numbers of individuals coming to an ER believing they have been exposed) (Morganstein et al., 2016; Shigemura & Chhem, 2016). Pandemics have the potential for global reach, affecting populations worldwide. The outbreaks of Severe Acute Respiratory Syndrome (SARS), H1N1 Influenza, and Ebola brought worldwide attention to the spread of infectious disease and raised issues of adherence with medical recommendations, quarantine, and travel restrictions. These events emphasize the critical and immediate need for increased and targeted global disaster mental health planning for individuals, families, communities, and nations.

Disasters affect large and diverse populations. How the psychological response to a disaster is managed may be the defining factor in the ability of a community to recover (Norris et al., 2008; Plough et al., 2013). Interventions require rapid, coordinated, effective, and sustained mobilization of resources (for reviews, see McFarlane & Williams, 2012; North & Pfefferbaum, 2013; Ursano & Friedman, 2006). Sustaining the social fabric of the community and facilitating recovery depend on leadership's knowledge of a community's resilience and vulnerabilities as well as an understanding of the distress, disorder, and health risk behavioral responses to the event (Institute of Medicine [IOM], 2003). A coordinated systems approach across medical, public health, and emergency response systems is necessary to meet

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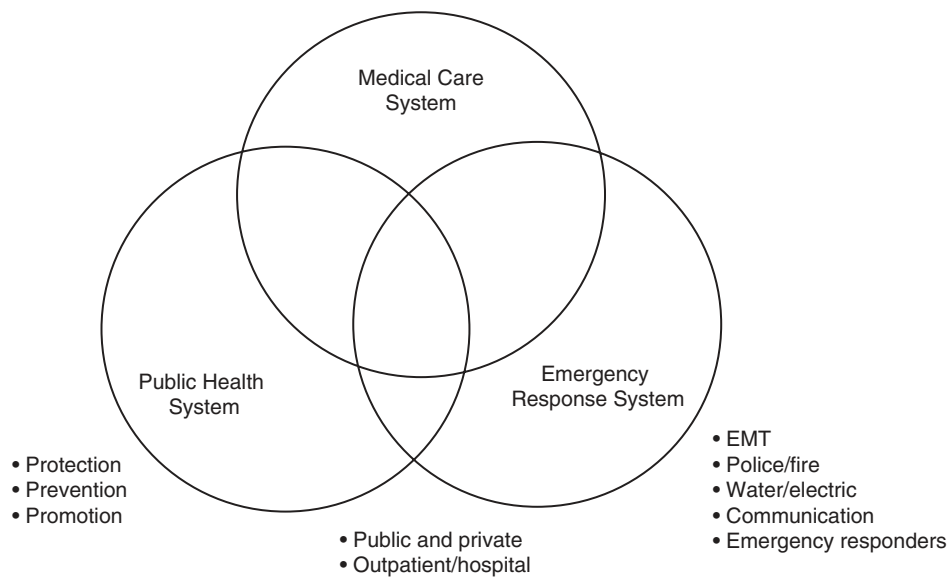


Figure 1.1 Coordinated Systems Approach

the mental health care needs of a disaster region (Pfefferbaum et al., 2012) (see Figure 1.1).

Over time, the resilience of individuals and communities is the expected response to a disaster, but for some the effects can be severe and lasting. Experiencing an altered sense of safety, increased fear and arousal, and concern for the future affect not only those who may develop mental health problems but also those who continue to work and care for their families and loved ones. Consequence management for mental health – fostering resilience, decreasing and treating disorders, and responding to health risk behaviors – requires preparing for, responding to, and focusing on the mitigation of disaster effects and recovery. For those directly exposed and those indirectly affected, the additional burdens of lost supports and increased demands are an ongoing part of disaster recovery. Importantly, early identification of individuals at risk for developing psychiatric disorders versus those experiencing transient distress is key to delivering effective treatment (Goldmann & Galea, 2014; Kessler et al., 2014) in the aftermath of large-scale disasters.

The Nature of Disaster

A disaster is the result of exposure to a hazard that threatens personal safety, disrupts community and family structures, and results in personal and societal loss creating demands that exceed existing resources.

Disasters are grouped into two major types: natural, including climate-related (e.g., floods and storms); and human-made, including non-intentional technological disasters (e.g., nuclear accidents such as Chernobyl and Fukushima) and intentional acts such as terrorism and mass violence (e.g., mass shootings and bombings). In general, human-made disasters have been shown to cause more frequent and persistent psychiatric symptoms and distress (for review, see Galea et al., 2005; Norris et al., 2002). However, this distinction is increasingly difficult to make. The consequences of natural disasters often are the result of actions by human beings. For example, the damage and loss of life caused by an earthquake can be magnified by poor construction practices and high-density occupancy. Similarly, humans may cause or contribute to natural disasters through poor land management practices that increase the probability of floods. Interpersonal violence between individuals (assault) or groups (war, terrorism) is perhaps the most disturbing traumatic experience. Technological disasters can also bring specific fears about usually normal life events (e.g., fear of flying after a plane crash or claustrophobia after a mine accident). Each of these may require public education or individual evaluation and intervention to assist population-level concerns or treat a persistent specific phobia and limit generalization to other areas of life (e.g., “I cannot cook anymore because the boiling water reminds me

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of the explosion"). Mass violence is the most disturbing of disasters (for review, see Orcutt et al., 2014). A review of more than 60,000 disaster victims found that 67% of those exposed to mass violence were severely impaired compared to 39% of those exposed to technological disasters and 34% of those exposed to natural disasters (Norris et al., 2002). Risk factors following mass shootings include pre-trauma vulnerability, exposure to the event, resource loss, and maladaptive coping (Orcutt et al., 2014).

Psychiatric morbidity is associated with specific aspects of disasters. The risk of psychiatric morbidity is greatest for those with high perceived threat to life, low controllability, lack of predictability, high loss, injury, the possibility that the disaster will recur, and exposure to the dead and the grotesque (Norris et al., 2009; Schuster et al., 2001). Disasters with a high degree of community destruction and those in developing countries are associated with worse outcomes (for review, see Davidson & McFarlane, 2006). Terrorism can be distinguished from other natural and human-made disasters by the characteristic extensive fear, loss of confidence in institutions, unpredictability, and pervasive experience of loss of safety (Fullerton et al., 2003). In New York City after the terrorist attacks of 9/11, 7.5% of southern Manhattan residents had probable posttraumatic stress disorder (PTSD; Galea et al., 2002). Nearly one-third of people with the highest levels of exposure (e.g., 37% of those in the building or 30% of the injured) had PTSD. Rates of PTSD decreased to 0.6% six months later. In addition, the effects of terrorism can echo through a nation. In a longitudinal national study of the reactions to the September 11 disaster, 64.6% of the United States outside of New York City reported fear of future terrorism at two months and 37.5% at six months (Silver et al., 2002).

In addition, 59.5% reported fear of harm to family at two months and 40.6% at six months. In the weeks following the bombings in London in 2005, 31% of Londoners reported substantial stress and 32% reported that they intended to travel less (Rubin et al., 2005). Those reporting greater stress were 3.8 times more likely to have thought they could have been injured or killed and 1.7 times more likely to report having difficulty contacting friends or family by mobile phone. Four to seven months after Hurricane Katrina in the United States, in the highest-impact area (the city of New Orleans), 49.6% reported nightmares and 8% reported these nightmares were

occurring nearly every night (Kessler et al., 2006). Similarly, 58.2% reported being more jumpy or easily startled and 79.4% reported being more irritable or angry. Findings following the March 11, 2004 train bombings in Madrid, Spain, again indicate that the magnitude of a terrorist attack is one of the primary determinants of the prevalence of PTSD (Miguel-Tobal et al., 2006).

Nuclear exposure has unique psychological and medical challenges such as increased anxiety and distress associated with fear of exposure and contamination (Morganstein et al., 2016; Shigemura & Chhem, 2016). The Fukushima nuclear disaster that followed the Great East Japan Earthquake and tsunami resulted in the loss of 19,000 lives (<http://fukushima-ontheglobe.com/the-earthquake-and-the-nuclear-accident/whats-happened#sthash.cJ1wXaWy.dpuf>). Approximately 160,000 people were evacuated, and more than two years later 81,000 people remained displaced (World Nuclear Association, 2016). In the early aftermath of Fukushima, there was an increase in depression, anxiety, and PTSD, most notably in those displaced from their homes (Yamashita & Shigemura, 2013). In the seven months following the event, there was an increase in suicide rates among females in disaster-affected areas (Orui et al., 2014). Importantly, nearly 25 years after the Chernobyl nuclear disaster, first responders, cleanup workers, and mothers who had small children experienced continuing elevated levels of depression, anxiety, posttraumatic stress, and reported experiencing poor health (Bromet et al., 2011).

Community Response to Disaster

Disasters overwhelm local resources and threaten the function and safety of the community. With the advent of instantaneous communication and media coverage, word of a disaster is disseminated quickly and often is witnessed in real time around the globe. The disaster community is soon flooded with outsiders: people offering assistance, curiosity seekers, and the media. This sudden influx of strangers affects the community in many ways (see Bonanno et al., 2010). The presence of large numbers of media representatives can be experienced as intrusive and insensitive. Hotel rooms have no vacancies, restaurants are crowded with unfamiliar faces, and the normal routine of the community, already affected by the disaster itself, is further altered by the influx of individuals associated with

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the disaster, such as the media. In the face of disaster, communities tend to pull together, often with outside assistance, such as the financial and humanitarian aid seen following the Asian tsunami (Ghodse & Galea, 2006). At a time when, traditionally, communities turn inward to grieve and assist affected families, the normal social supports are strained and disrupted by outsiders.

Disruption of the community and workplace increases distress responses, health risk behaviors, and risk of posttraumatic stress disorders. In the immediate aftermath of a disaster or terrorist attack, individuals and communities may respond in adaptive, effective ways, or they may make fear-based decisions, resulting in unhelpful behaviors. Fostering psychological functioning and minimizing psychiatric disease, including the subthreshold distress of individuals, requires rapid, effective, and sustained mobilization of health care resources as well as community-level responses and resources. Knowledge of an individual's and community's resilience and vulnerability before a disaster or terrorist event as well as having an understanding of the psychiatric and psychological responses to such an event enables leaders and medical experts to talk to the public in order to promote resilient healthy behaviors, sustain the social fabric of the community, and facilitate recovery (IOM, 2003).

Important to sustaining community resilience is building adaptive capacities such as economic development, social capital, information and communication, and community competence (Norris et al., 2008). The adaptive capacities of individuals and groups within a community are variable and need to be understood before a crisis in order to target needs effectively after a disaster. Community embeddedness – the degree to which one belongs to and is connected in one's neighborhood and community – may be both a risk factor and a protective factor after community-level disasters (see Fullerton et al., 2015b; Sampson et al., 1997; Ursano et al., 2014). Community-level characteristics such as collective efficacy (i.e., social cohesion among neighbors, i.e., their willingness to intervene for the common good) (Sampson et al., 1997) mitigate the impact of the psychological consequences following disasters (Ahern & Galea, 2011; Benight, 2004; Gapen et al., 2011; Sampson et al., 1997). Higher levels of community collective efficacy were associated with lower levels of PTSD (Ursano et al., 2014) and depressive symptoms (Fullerton et al., 2015b) in a large

sample of Florida Department of Health (FDOH) disaster workers nine months following multiple hurricanes in 2004, even after adjusting for individual and community sociodemographic characteristics, individual injury/damage, and community storm damage. Programs enhancing community strength are an important part of prevention. Intervening at a community level is often cost-effective and practical, and can reach individuals who may not seek or have available individual interventions post-disaster.

The community and workplace also serve as important physical and emotional support systems. The larger the scale of the disaster, the greater the potential disruption of the community and workplace. It is helpful to compare the generic and unique challenges facing survivors of an airplane crash with those confronting victims of disasters such as tornadoes, earthquakes, or terrorist attacks (see Table 1.1). If family members are involved in the same airplane crash, the plane crash survivor can return home to family, friends, and coworkers. They will most likely go back to a structurally intact house, to a community unaffected by the accident, and to the same job with the same financial security. In contrast, a tornado involves additional factors that amplify the traumatic event itself. Although the tornado survivor may experience and witness comparably gruesome sights, the recovery environment is markedly different. Home and worksite may have been destroyed, jobs lost, schools closed, food and water scarce, relatives and friends moved or perished, and coworkers may be dead, injured, or displaced. Thus, psychiatric morbidity is affected by the degree of the disaster's impact on the community and its effects on the recovery environment and interpersonal relationships (Bonanno et al., 2010; Felix & Afifi, 2015).

The economic impacts of disasters are substantial. Loss of a job is a major post-event predictor of negative psychiatric outcome (Galea et al., 2002). These effects can also be observed at the macro level; for example, a dip in consumer confidence was seen during and after the sniper attacks in the Washington, DC area in October 2002. Since terrorism targets the social capital of a nation – a nation's cohesion, values, and ability to function – economic behavioral changes can be substantial. Counterterrorism and national continuity are crucially dependent on having effective interventions to sustain the psychological, behavioral, and social function of the nation and its citizens. The psychological and behavioral

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Table 1.1 Generic and Unique Challenges in Natural Disaster, Technological Disaster, and Terrorism

Dimension	Natural disaster ^a	Technological disaster ^b	Terrorism ^c
Altered sense of safety	+++	+++	+++
Intentional			+++
Unpredictable	++	+++	+++
Localized geographically	+++	++	
Local fear	+++	+++	++
National fear			+++
National bereavement	+	+	+++
Consequences spread over time	++	++	+++
Loss of confidence in institutions	+	+++	+++
Community disruption	+++	+++	+++
Target basic societal infrastructure			+++
Overwhelm health care systems	+++	++	+
Hoaxes/copycats			+++

^a Natural disasters, e.g., hurricanes, tornados, earthquakes
^b Technological disasters, e.g., nuclear leaks, toxic spills
^c Terrorism, e.g., bombings, hostage taking

consequences of disasters are a complex interaction between the disaster impact (e.g., destruction and death), the consequences of the response (e.g., economic loss, disruption, etc.), and the impact of subsequent preparedness or counterterrorism strategies themselves (e.g., behavioral and social ramifications of new security procedures).

Certain economic behaviors and decisions are affected by both the characteristics of disaster or terrorist attack and the psychological and behavioral responses to that disaster. For example, after Hurricane Katrina in the United States or the terrorist attacks seen in cities around the world, decisions and behaviors related to travel, home purchase, food consumption, and medical care visits were altered by changes in availability (Weisler et al., 2006), as well as by changes in perceived safety and optimism about the future. Terrorism also can affect economic behavior through threats and hoaxes. These carry with them economic costs and consequences. The local or national economy may see altered savings, insurance, and investment markets, changes in work attendance and productivity, and broader national or industry-specific consequences such as disrupted transportation, communication, and energy networks.

In the early phase of a disaster, at the population level, there is often a sense of cohesion and a “honeymoon” of working together (see Figure 1.2). Later,

disillusionment, mistrust, and anger are common. Inevitably, after any major disaster, there are also rumors circulated within the community about the circumstances leading up to the event and the government response. Sometimes there is a heightened state of fear. For example, a study of a school shooting in Illinois noted that a high level of anxiety continued for a week after the event, even after it was known that the perpetrator had committed suicide (Schwarz & Kowalski, 1991). Similarly after Hurricane Katrina in the United States, rumors and expectations of looting and shootings by police changed trust in law enforcement and in the community. After the London bombings and the regrettable shooting of a fleeing individual by police, the community had to recover and understand.

Over time, anger often emerges in communities. Typically, there is a focus on accountability – a search for someone who was responsible for a lack of preparation or inadequate response. Mayors, police and fire chiefs, and other community leaders are often targets of these strong feelings. Scapegoating can be an especially destructive process when leveled at those who already hold themselves responsible, even if, in reality, there was nothing they could have done to prevent adverse outcomes. In addition, nations and communities experience ongoing hypervigilance and a sense of lost safety while trying to reestablish normality in their lives.

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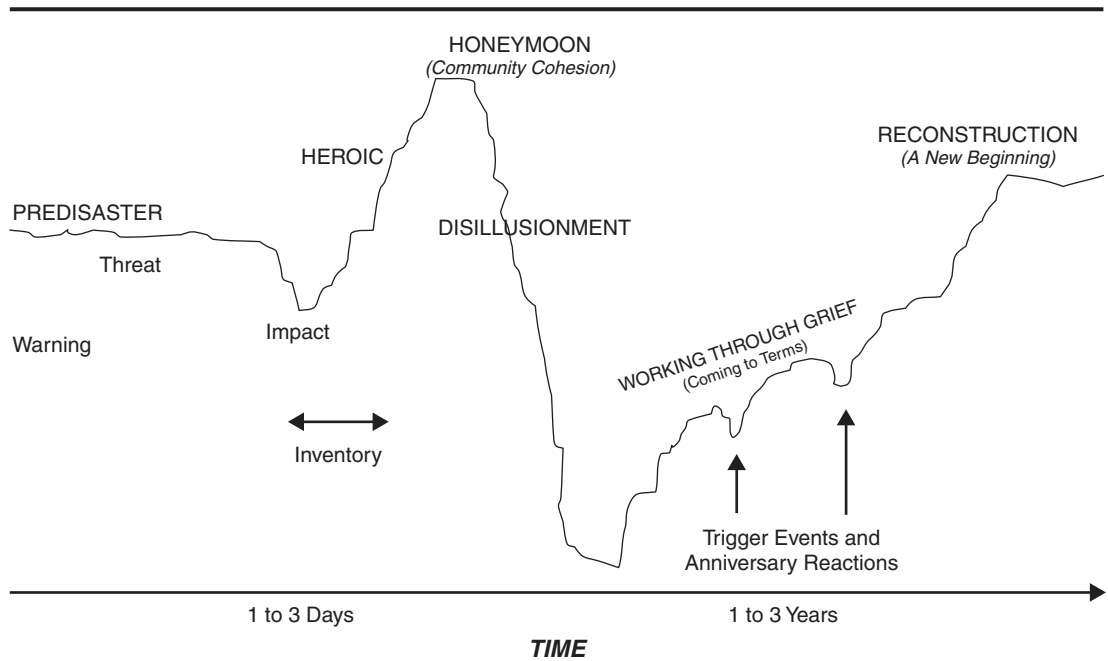


Figure 1.2 Phases of Disaster (adapted from Zunih & Myers, 2000)

There are many milestones of a disaster that both affect the community and may offer opportunities for recovery. Outpourings of sympathy for the injured, dead, and their friends and families are common and expected. There are the normal rituals associated with burying the dead. Later, energy is poured into creating appropriate memorials. Memorialization carries the potential to cause harm as well as to do good. There can be heated disagreement about what the monument should look like and where it should be located. Special thought must be given to the placement of a memorial: if it is situated too prominently so that community members cannot avoid encountering it, the memorial may heighten intrusive recollections and interfere with the resolution of grief reactions. Impromptu memorials of flowers, photographs, and memorabilia are frequently erected. It is important to distinguish between this type of spontaneous memorialization (e.g., candles and photos after 9/11) and more formalized and planned memorials. Places of worship play an important role in assisting communities in their search for meaning from such tragedy and in assisting in the grief process. Anniversaries of the disaster often stimulate renewed grief, and planning for these events can mitigate adverse effects on a community.

Disorder, Distress, and Health Risk Behaviors

The majority of people exposed to disasters recover with little or no ill effects; some individuals, however, develop psychiatric disorders, distress, or health risk behaviors such as an increase in alcohol or tobacco use (see Figure 1.3). The effects of disaster can be rekindled by new experiences that remind the person of the past traumatic event (Holloway & Ursano, 1984). At times, disasters may also have unexpected beneficial effects by serving as organizing events and providing a sense of purpose and an opportunity for positive growth experiences (for reviews, see Foa et al., 2009; Krystal, 2008; Southwick et al., 2014).

Exposure to a traumatic event is the essential element for development of acute stress disorder (ASD) or PTSD. While such exposures occur in disasters, it is important to note that traumatic exposure is a relatively common experience. Approximately 50–70% of the U.S. population is exposed to a traumatic event sometime during their lifetime, but only 5–12% develop PTSD. In a nationally representative study of 5,877 people aged 15–45 in the United States, the National Comorbidity Study (NCS) found the lifetime prevalence of exposure to trauma to be 60.7% in men

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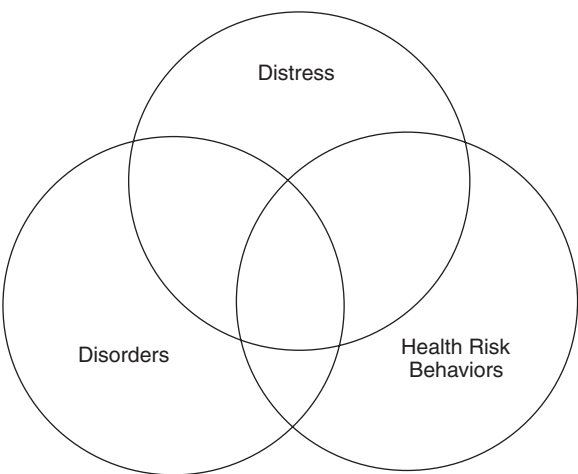


Figure 1.3 Disaster Responses

and 51.2% in women (Kessler et al., 1995). In a nationally representative sample of women in the United States, the National Women’s Study (NWS) found that 69% of women were exposed to a traumatic event at some time in their lives (Resnick et al., 1993). Over a lifetime, any given individual is very likely to be exposed to a traumatic event.

Disorder

Posttraumatic stress disorder has been widely studied following both natural and human-made disasters (for reviews, see Goldmann & Galea, 2014; North, 2014; North & Suris, 2012; Santiago et al., 2013). PTSD is not uncommon following many traumatic events, from terrorism to motor vehicle accidents to industrial explosions. In its acute form, PTSD may be more like the common cold, experienced at some time in one’s life by nearly all. However, when it persists, it can be debilitating and require psychotherapeutic and/or pharmacological intervention.

The NCS found rates of PTSD to be 7.8%, while the NWS found rates of PTSD to be 12.3%. In an epidemiological study of people belonging to an urban health maintenance organization in the United States, Breslau et al. (1991) found the lifetime prevalence of PTSD to be 9.2% for adults. Summary estimates of PTSD prevalence in the first year after a disaster were between 30% and 40% in direct victims, between 10% and 20% in rescue workers, and between 5% and 10% in general populations (for review, see Galea et al., 2005). Lifetime estimates of PTSD in U.S. nationally representative samples (U.S. National Comorbidity

Survey Replication; NCS-R) were 5.7%, lifetime morbid risk (LMR) of 10.1% (number expected to experience PTSD in the future) (Kessler et al., 2012), and 12% lifetime prevalence in the veteran population (Tsai et al., 2015). Preexisting posttraumatic disorders can put individuals at increased risk for trauma exposure (Breslau & Schultz, 2013).

The development of the PTSD diagnostic criteria for the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5) (American Psychiatric Association [APA], 2013) was undertaken by an APA selected subwork group of national experts and a group of expert advisors (see Friedman, 2013, 2014). Evidence-based decisions were made by consensus and modified by empirical data (Schnurr, 2013). Major changes included establishing a new DSM-5 diagnostic category, “Trauma and Stressor-Related Disorders,” and the addition of preschool and dissociative subtypes of PTSD. The four-factor structure (intrusion symptoms, persistent avoidance, negative alterations in cognitions and mood, and marked alterations in arousal and reactivity) of the DSM-5 PTSD diagnosis retains the 17 PTSD criteria from DSM-IV with some modifications and the addition of three new symptoms (see Friedman, 2013; Kilpatrick et al., 2013). Early field trials of the DSM-5 criteria used test-retest reliability among diagnosticians. An internet survey compared the new DSM-5 criteria with DSM-IV in a national sample of 3,000 (see the National Stressful Events Web Survey; Kilpatrick et al., 2013). The diagnostic criteria for DSM-5 PTSD demonstrated good test-retest reliability and clinical utility and the structure with good ease of use (Regier et al., 2013). PTSD prevalence using the DSM-5 was slightly lower than DSM-IV (Kilpatrick et al., 2013). Differences were due to tightening Criterion A for indirect exposure in DSM-5, elimination of criterion A2, and the requirement of one avoidance symptom to diagnose PTSD in DSM-5 (Miller et al., 2013). Initial studies of confirmatory factor analyses of PTSD in DSM-5 showed the four-factor structure was a good fit and representation of PTSD’s latent structure, and symptoms within each DSM-5 cluster loaded well together (see Armour et al., 2016; Friedman, 2014; Schnyder et al., 2015). Revisions to the PTSD diagnosis in the *International Classification of Diseases, 11th Revision* (ICD-11) emphasize clinical utility (i.e., identification and treatment of disorder), ease of use in low-resource settings, and the elimination of symptoms shared with other disorders (Maercker et al., 2013). The narrower

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Box 1.1 Trauma-related disorders

Psychiatric Diagnoses

- Posttraumatic stress disorder
- Acute stress disorder
- Major depression
- Substance use disorders
- Generalized anxiety disorder
- Adjustment disorder
- Organic mental disorders secondary to head injury, toxic exposure, illness, and dehydration
- Somatization
- Psychological factors affecting physical disease (in the injured)

set of symptoms are grouped into three clusters: re-experiencing, avoidance of traumatic reminders, and hyperarousal.

PTSD is not, however, the only trauma-related disorder, nor perhaps the most common (Norris et al., 2002; North & Pfefferbaum, 2013) (see Box 1.1). People exposed to disaster are at increased risk for depression (e.g., Miguel-Tobal et al., 2006), generalized anxiety disorder, panic disorder, and increased substance use (Breslau et al., 1991; Kessler et al., 1995; North et al., 1999, 2002; Vlahov et al., 2002). Forty-five percent of survivors of the Oklahoma City bombing had a post-disaster psychiatric disorder. Importantly, of these, 22.5% had major depression (North et al., 1999). Nearly 40% of those with PTSD or depression had no previous history of psychiatric illness (North et al., 1999).

After a disaster or terrorist event, the contribution of the psychological factors to medical illness can also be pervasive – from heart disease to diabetes. Injured survivors often have psychological factors affecting their physical condition.

Acute stress disorder was introduced into the diagnostic nomenclature in DSM-IV (APA, 1994). At the time of its introduction, ASD was thought to be a predictor for development of PTSD. A systematic analysis of 22 studies using DSM-IV indicated that ASD had reasonable predictive power, with the majority of studies indicating that at least half of those with ASD met criteria for PTSD (Bryant, 2011). In contrast, the sensitivity was poor (i.e., most people who developed PTSD did not meet criteria for ASD). Of 3,335 individuals across the 22 studies, 497 met criteria for PTSD; however, only 238 (48%) had met criteria for ASD. ASD,

therefore, failed to identify nearly half of those who subsequently develop PTSD. Despite the predictive problems, there is a need to identify people with acute responses to trauma that might need mental health treatment, therefore modifications were made to the ASD diagnosis in the DSM-5. ASD no longer requires symptoms to be present in specific clusters (see APA, 2013; Armour & Hansen, 2015; Bryant et al., 2011; Hansen et al., 2015). The DSM-5 requires 9 out of a total of 14 symptoms to be present across five categories (intrusive symptoms, negative mood, dissociative symptoms, avoidance symptoms, and arousal symptoms) occurring from three days to one month after trauma exposure. Major depression, generalized anxiety disorder, substance abuse, and adjustment disorders in disaster victims have been less often studied than ASD and PTSD, but available data suggest that these disorders also occur at higher than average rates (Galea et al., 2002; Kessler et al., 1999; Miguel-Tobal et al., 2006). Major depression, substance abuse, and adjustment disorders (anxiety and depression) may be relatively common in the 6–12 months after a disaster and may reflect survivors’ reactions to their injuries, to feelings stimulated by the disaster, and/or to their attributions of symptoms to the disaster.

The occurrence of these psychiatric disorders is also mediated by secondary stressors following a disaster (Galea et al., 2007; Kessler et al., 2012). These include complicated grief associated with personal losses (Shear et al., 2011) as well as the problems of practical disaster recovery, such as negotiations with insurance companies for reimbursement or unemployment (Galea et al., 2007). Major depression and substance abuse (drugs, alcohol, and tobacco) are frequently comorbid with PTSD and warrant further study (Davidson & Fairbank, 1993). Increased substance use (without abuse) is also seen and affects morbidity and mortality through potential risk behaviors such as motor vehicle accidents, risky sexual behaviors, and family violence (Fullerton et al., 2004; Galea et al., 2002).

Distress and Health Risk Behaviors

Distress and health risk behaviors include nonspecific distress (for review, see Norris et al., 2002), stress-related psychological and psychosomatic symptoms (McCarroll et al., 2002), sleep disturbance, increased alcohol, caffeine, and cigarette use (Vlahov et al., 2002), as well as family conflict and family violence (see Boxes 1.2 and 1.3). Following the bombings in

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Box 1.2 Posttraumatic distress

- Grief reactions and other normal responses to an abnormal event
- Altered interpersonal interactions (withdrawal, aggression, violence, family conflict, family violence)
- Decreased work functioning (ability to do work, concentration, absenteeism, quitting, effectiveness on the job)
- Change in safety/travel
- Sleep disturbance
- Loss of concentration

Box 1.3 Health risk behaviors

- Change in smoking
- Change in alcohol consumption
- Balancing home and work life
- Evacuation
- Overdedication
- Adherence to medical recommendations

London, 31% of Londoners reported substantial distress and 32% reported behavioral changes (i.e., the intent to travel less) (Rubin et al., 2005). Anger, disbelief, sadness, anxiety, fear, and irritability are expected responses following trauma. Anxiety and family conflict can accompany the distress and fear of recurrence of a traumatic event, the ongoing threat of terrorism, and the economic impact of lost jobs and companies closing or moving as a result of a disaster.

Following mass shootings, knowing a victim and being closer in proximity to the event increase vulnerability and feelings of distress (for review, see Lowe & Galea, 2015). After September 11, substantial numbers of people wished to stay home and might well have met the diagnosis of separation anxiety. The seeming randomness of terrorist acts such as the Washington, DC sniper attacks in 2002 can affect individuals' perception of control, resulting in distress about routine activities and subsequent avoidant behaviors. Approximately 8% of the 1,238 residents of the Washington, DC area during the sniper attacks had probable PTSD, 22% had mild to severe depression, and 4% increased alcohol use (Fullerton et al., 2015a). Distress related to routine activities and perceived safety was associated with increased posttraumatic stress and depressive symptoms and alcohol use. Community disaster communication strategies should target safety as well as distress-related behaviors.

There is an association between disaster exposure and substance use disorders (Nordlokken et al., 2013; North et al., 2011, 2013; Ueda et al., 2016) and increased alcohol and drug consumption following disasters (e.g., see Boscarino et al., 2006; Grieger et al., 2003; Vlahov et al., 2004). Importantly, new onset of alcohol and drug use disorders occurs only rarely after disaster (North et al., 2011).

Somatic symptoms can also be an indicator of disaster-related distress. Assessing exposure to disaster events may be overlooked by overburdened primary care physicians after a disaster. Somatization is common after a disaster and must be managed both in the community at large and in individual patients. Disaster and rescue workers also report increased somatic symptoms after disaster exposure (McCarroll et al., 2002). Somatization is a frequent presentation of anxiety and depression in patients seeking care in medical clinics. Recognizing these symptoms as an indicator of distress can help in the appropriate diagnosis and treatment and minimize inappropriate medical treatments. Medical evaluation, which includes inquiring about family conflict, can provide reassurance as well as begin a discussion for referral, and be a primary preventive intervention for children whose first experience of a disaster or terrorist attack is mediated through their parents. Sleep disturbances following trauma are common clinical problems that present to clinicians for treatment. Sleep difficulties can be due to grief, anxiety related to recurrent disaster events (e.g., aftershocks), the ongoing threat of terrorist attacks, or underlying psychiatric disease such as depression or PTSD (Mellman et al., 1995). Posttraumatic distress must be considered in the differential diagnosis and appropriate treatments initiated.

Anger and hostility and accompanying social disruption, feelings of frustration, and perception of chaos are also common following disaster (for meta-analysis, see Orth & Wieland, 2006). Although in some cases it is helpful for individuals to recognize that the return of anger can be a sign of a return to normal (i.e., it is again safe to be angry and express one's losses, disappointments, and needs), in others hostility should remind the care provider to assess the risk of family violence and substance abuse. Anger is associated with PTSD in veterans (Elbogen et al., 2010; Taft et al., 2012) and civilians (Orth et al., 2008), though the association appears stronger in military populations (see Orth & Wieland, 2006). In a large

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sample of National Guard and Reserve soldiers, the association between anger and PTSD severity was similar for deployment- and non-deployment-related events, although this association was modified by gender (Worthen et al., 2015). In men, the association between anger and PTSD severity was stronger for deployment-related events than non-deployment-events, and the reverse was true for women. Trauma-related anger should be examined in civilians and military populations and for men and women to inform interventions.

Disaster behavior, how one acts at the time of impact of a disaster, also affects morbidity and at times mortality. Studies of evacuation from the World Trade Center towers in 1993 after a terrorist truck bomb showed that those evacuating in groups greater than 20 took more than six minutes longer to decide to evacuate (Aguirre et al., 1998). In addition, the more people knew each other in the group, the longer the group took to initiate evacuation. After the 9/11 attacks, rather than leave the disaster area, victims from the Twin Towers tended to congregate at the site (Centers for Disease Control, 2004). Overdedication to one's group can also lead firefighters, police, and other first responders to needlessly risk their lives. In pandemics or after a bioterrorism attack, adherence to medical recommendations can be a lifesaving behavior and prevent the spread of illness.

Bereavement and Grief

Increasingly, traumatic loss and the bereavement and grief associated with the traumatic loss are recognized as posing special challenges to survivors of disasters and other traumatic events (Prigerson et al., 2009; Raphael et al., 2004; Shear, 2015; Shear et al., 2011). While the death of loved ones is always painful, an unexpected and violent death is most difficult (for review, see Kristensen et al., 2012). Even when not directly witnessing the death, family members can develop intrusive images based on information gleaned from authorities or the media. Grief reactions following a violent death (e.g., homicide or terrorist attack) have been conceptualized as involving PTSD and depressive symptoms (Bonanno et al., 2007). Complicated grief (CG) (Shear et al., 2011), or prolonged grief disorder (PGD) (Prigerson et al., 2009), affects approximately 2–3% of the population worldwide (He et al., 2014; Shear, 2015). In the DSM-5, CG is a subtype under, “Other Specified Trauma and

Stressor-Related Disorder,” called persistent complex bereavement disorder (PCBD) (APA, 2013). Proposed criteria for PCBD is specified in DSM-5 under “Conditions Requiring Further Study,” and does not require the death to be violent or accidental unless specified as PCBD, “with traumatic bereavement” (i.e., bereavement due to homicide or suicide) (for review, see Bui et al., 2015; Prigerson et al., 2009; Shear, 2015; Shear et al., 2011). In children, traumatic play, a phenomenon similar to intrusive symptoms in adults, is both a sign of distress and an effort at mastery (Terr, 1981). Effective leadership after disasters includes “grief leadership,” an important aspect of giving permission to grieve and teaching and showing people how to grieve (Ursano & Fullerton, 1990).

Risk Factors and Vulnerable Populations

We are only beginning to understand why some people exposed to disasters develop posttraumatic psychopathology and some people do not (for meta-analyses of risk factors for PTSD, see Brewin et al., 2000). Protecting vulnerable individuals and communities against disaster is a critical component of disaster preparedness and response (Kessler et al., 2014; Norris et al., 2002; Somasundaram & van de Put, 2006). Special populations such as women, children and adolescents, older individuals, individuals with preexisting health problems, and the poor are at increased risk for psychological morbidity following disasters (for review, see Norris et al., 2002; Somasundaram & van de Put, 2006). Trauma severity, lack of social support, and life stress have a greater effect on the development of PTSD than do preexisting factors such as demographics, preexisting psychiatric illness, and family psychiatric history (Brewin et al., 2000).

Posttraumatic psychiatric disorders are most often seen in the primary victims – those directly exposed to the threat to life and the horror of a disaster. The greater the “dose” of traumatic stressors, the more likely an individual or group is to develop high rates of psychiatric morbidity. In addition, those who have significant attachments with the primary victims, first responders, and support providers are all at risk (for reviews, see Neria et al., 2002; 2008) (see Box 1.4). In particular, adults, children, and the elderly who were in physical danger and who directly witnessed the events are at risk. Those who were psychologically vulnerable before exposure to a disaster are also buffeted