PART I

Introduction

1

Individual and community responses to disasters

Robert J. Ursano, Carol S. Fullerton, Lars Weisaeth, & Beverley Raphael

While most of our work force returned to work soon after the hurricanes many were walking wounded. They were unfocused, spacey, not performing at their usual levels, and performance was inconsistent. I noticed this in other people before I realized that it was happening to me. The feelings and changes lingered longer than I would have thought – for months. The change in the environment – the loss of trees, ''blue tarp'' roofs, boarded-up houses that stayed boarded-up long after the threat of storms – and living in a dark cluttered home, all seemed to add to my deep sense of lethargy. It all weighed heavily on myself, my family, friends, and co-workers . . . We didn't do any of the usual summer social get-togethers. The storms didn't just affect us when the wind blew, but changed the landscape of our lives . . . I remember thinking that my neighborhood looked like an abandoned ghost town. The only neighbors I saw day to day were those who were out walking their dogs. Things are back to normal now, but there is still an edginess to us all I think. I guess now that the repairs are done it's time again to ''board-up'' and wait for this year's storms.

(Public Health Worker 9 months after five hurricanes had struck Florida in the summer of 2004)

In 2005, an estimated 162 million people worldwide were affected by disaster (i.e., natural disasters, industrial and other accidents, and epidemics). Over 105 000 people died and damages totaled over $176 million (World Health Organization, 2006). Concern for weather-related disasters – hurricanes and tsunamis – has increased over the past decade as has the concern for pandemic flu, which raises special issues of health protective behaviors such as adherence with medical recommendations, quarantine and travel restrictions. Terrorism and wars are human-made disasters. From the World Trade Center attacks of 2001, anthrax attacks in the United States, the 2004 train bombings in Madrid, the London tube attacks of 2005, to the ongoing terrorist attacks in the Middle East, terrorism has new prominence in disaster mental health planning for individuals, communities, and nations. 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 (www.globalsecurity.org). Worldwide in the year 2000, over 300 000 people died from war (World Health Organization, 2001). Every disaster, natural or human-made, places extreme demands on health care and mental health care in particular across federal, state and local agencies, communities, and workplaces.

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 (Holloway *et al.*, 1997). Interventions require rapid, effective, and sustained mobilization of resources (Ursano & Friedman, 2006). Sustaining the social fabric of the community and facilitating recovery depend on leadership's

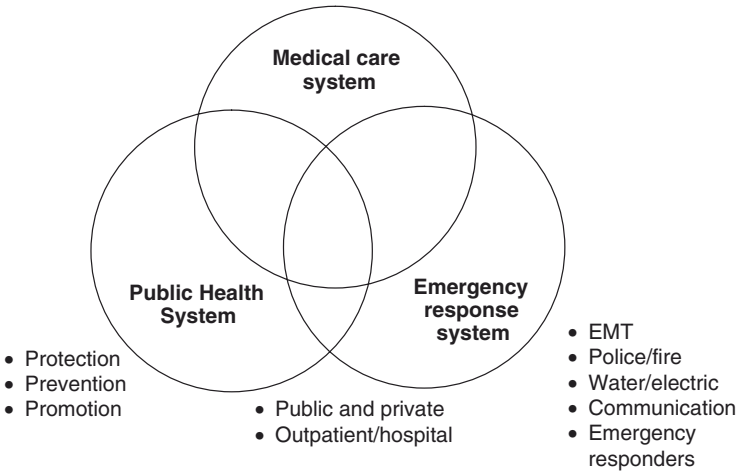

Figure 1.1 Coordinated systems approach

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, 2003; Raphael & Wooding, 2004). A coordinated systems approach across the medical care system, public health system, and emergency response system is necessary to meet the mental health care needs of a disaster region (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, in the aftermath of large-scale disasters, such as the Asian tsunami of 2004 which affected thousands, early identification of individuals at risk for developing psychiatric disorders from those experiencing transient distress is key to delivering effective treatment (Bryant & Njenga, 2006).

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 and human-made. Human-made disasters include technological accidents resulting from human error and intentional human acts such as terrorism. In general, human-made disasters have been shown to cause more frequent and more persistent psychiatric symptoms and distress (for review see Norris *et al.*, 2002). However, this distinction is increasingly difficult to make. The etiology and consequences of natural disasters often are the result of 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 may also bring specific fears about usually normal life events – for example, 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 of the explosion''). Mass violence is the most disturbing of disasters. A review of over 60 000 disaster victims found 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).

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 (Boudreaux *et al.*, 1998; Epstein *et al.*, 1997; Green *et al.*, 1985; North *et al.*, 1999; Schuster *et al.*, 2001; Wain *et al.*, 2006; Zatzick *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 September 11, 2001, 7.5% of southern Manhatten 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% 6 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 2 months and 37.5% at 6 months (Silver *et al.*, 2002). In addition, 59.5% reported fear of harm to family at 2 months and 40.6% at 6 months. In the weeks following the bombings in London, 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 Madrid March 11 train bombings 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). Terrorism is one of the most powerful and pervasive generators of psychiatric illness, distress and disrupted community and social functioning (Holloway *et al.*, 1997; North *et al.*, 1999).

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. 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

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 disaster, e.g., hurricanes, tornados, earthquakes.
[b] Technological disasters, e.g., nuclear leaks, toxic spills.
[c] Terrorism, e.g., bombings, hostage taking.

routine of the community is altered. 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, health risk behaviors and risk of post-traumatic 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. Psychiatric disease and psychological function, including the subthreshold distress of individuals, depend upon the 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 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 (Institute of Medicine, 2003; Ursano *et al.*, 2003b). 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. For example, 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.*, 1999; Sampson, 2003; Sampson *et al.*, 1997).

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 as well as those confronting victims of disasters such as tornados, 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 work site may have been destroyed, job 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 both the degree of the disaster's impact on the community and its effects on the recovery environment (Gerrity & Steinglass, 1994; Hobfoll & Jackson, 1991; Steinglass & Gerrity, 1990; Noji, 1997).

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; Nandi *et al.*, 2004). These effects can be seen at the macro level; for example, a dip in consumer confidence was seen during and after the sniper attacks in the Washington, D.C. area in October 2002. Since terrorism targets the social capital of the nation – a nation's cohesion, values, and ability to function – economic behavioral changes may be substantial. Counterterrorism and national continuity are crucially dependent upon our having effective interventions to sustain the psychological, behavioral, and social function of the nation and its citizens. The psychological and behavioral 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 on 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), and also by changes in perceived safety, and optimism about the future. Terrorism also can affect economic behavior through threats and hoaxes. These also carry with them economic costs and consequences. The local or national economy may see altered savings, insurance and investment, as well as changes in work attendance and productivity, and broader national or industry-specific consequences such as altered financial and insurance markets or disrupted transportation, communication, and energy networks.

Early after disaster 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 the 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

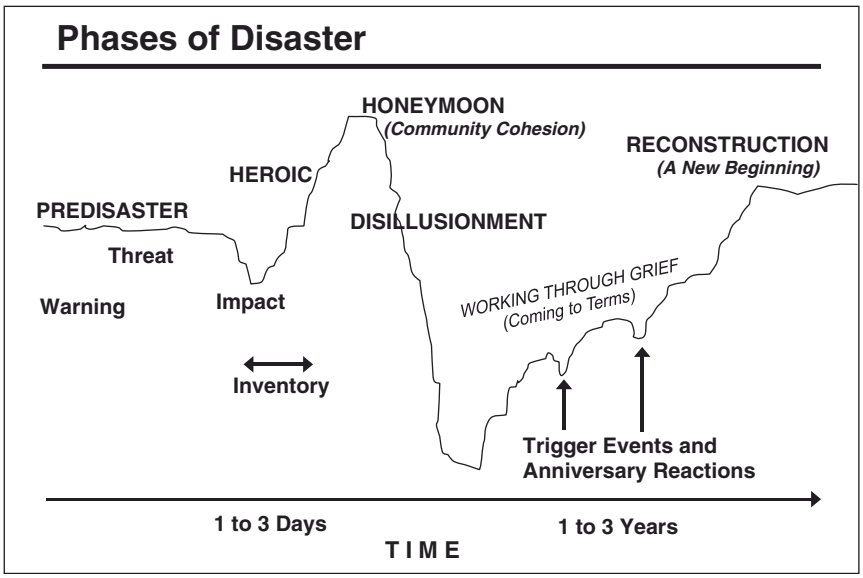

Figure 1.2 Phases of Disaster (adapted from Zunih & Myers, 2000)

ongoing hypervigilance and a sense of lost safety while trying to establish normality in their lives.

There are many milestones of a disaster which 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 memorials: 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 memoralization, e.g., candles and photos after 9/11, and more formalized and planned memorials. Churches and synagogues 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 (e.g., 1 year) often stimulate renewed grief.

Disorder, distress and health risk behaviors

The majority of people exposed to disasters do well; however, some individuals 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 may 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 (Foa *et al.*, 2000; Ursano, 1987).

Exposure to a traumatic event, the essential element for development of acute stress disorder (ASD) or post-traumatic stress disorder (PTSD), is a relatively common experience. Approximately 50%–70% of the United States population is exposed to a traumatic event sometime during their lifetime;

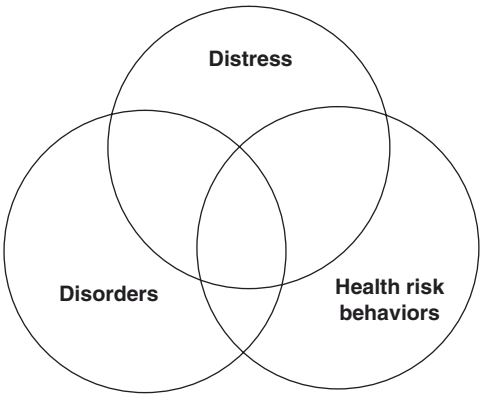

Figure 1.3 Disaster responses

Table 1.2 Trauma-related disorders

Psychiatric diagnoses
• Post-traumatic 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)

however, 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) (Kessler *et al.*, 1995) found the lifetime prevalence of exposure to trauma to be 60.7% in men and 51.2% in women. In a nationally representative sample of women in the United States, the National Women's Study (NWS) (Resnick *et al.*, 1993) found that 69.0% of women were exposed to a traumatic event at some time in their lives. Over a lifetime, any given individual is very likely to be exposed to a traumatic event.

Disorder

Post-traumatic stress disorder has been widely studied following both natural and human-made disasters (for review, see Fullerton & Ursano 1997; Saigh & Bremner, 1999; Breslau *et al.*, 2005). Post-traumatic stress disorder 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.

Post-traumatic stress disorder is not, however, the only trauma related disorder, nor perhaps the most common (Fullerton & Ursano, 1997; Norris *et al.*, 2002; North *et al.*, 1999) (see Table 1.2). 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). Nearly 40.5% of disaster workers following a plane crash met criteria for at least one diagnosis (i.e., acute stress disorder, PTSD, or depression) in a 13-month longitudinal study (Fullerton *et al.*, 2004). Exposed disaster workers with acute stress disorder were 7.33 times more likely to meet PTSD criteria at 13 months. Forty-five percent of survivors of the Oklahoma City bombing had a postdisaster psychiatric disorder. Of these 34.3% had PTSD and 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 (Leor *et al.*, 1996) to diabetes (Jacobson, 1996). Injured survivors often have psychological factors affecting their physical condition (Benedek *et al.*, 2002;

Kulka *et al.*, 1990; North *et al.*, 1999; Shore *et al.*, 1989; Smith *et al.*, 1990; Zatzick *et al.*, 2001).

Acute stress disorder was introduced into the diagnostic nomenclature in DSM-IV (American Psychiatric Association, 1994). Acute stress disorder is a constellation of symptoms very similar to PTSD but persists for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the trauma (see Bryant & Harvey, 2000). The only difference in symptom requirements between the two diagnoses is that dissociative symptoms must be present in order to diagnose ASD. The dissociative symptoms can occur during the traumatic event itself or after it. A common early response to traumatic exposure appears to be a disturbance in our sense of time, our internal time clock, resulting in time distortion – time feeling speeded up or slowed down (Ursano & Fullerton, 2000). Along with other dissociative symptoms this time distortion indicates an over four times greater risk for chronic PTSD and may also be an accompaniment of depressive symptoms. Acute stress disorder is diagnosed in 15%–20% of survivors of civilian trauma (Brewin *et al.*, 1999). As many as 80% of persons with ASD will develop PTSD at 6 months. However, it is also true that not everyone who develops PTSD had ASD in the first month. A recent review suggests that although acute dissociation is an important factor in early response to trauma, many people develop PTSD in the absence of dissociative symptoms (Bryant, 2005).

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 (Epstein *et al.*, 1998; Vlahov *et al.*, 2002). These include the problems of disaster recovery, such as negotiations with insurance companies for reimbursement, or unemployment secondary to destroyed businesses. Major depression and substance abuse (drugs, alcohol, and tobacco) are frequently comorbid with PTSD and warrant further study (Davidson & Fairbank, 1992; Rundell *et al.*, 1989; Shalev *et al.*, 1990). 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).

Grief reactions are common after all disasters, however little is known about complex grief as a disaster-specific outcome. Available studies of grief reactions following trauma do not greatly aid our understanding of who is at risk for persistent depression. Single parents may be at high risk for developing psychiatric disorders since they often have fewer resources to begin with, and they lose some of their social supports after a disaster (Solomon & Smith, 1994).

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 (Ford, 1997; McCarroll *et al.*, 2002), sleep disturbance, increased alcohol, caffeine, and cigarette use (Shalev *et al.*, 1990; Vlahov *et al.*, 2002) as well as family conflict and family violence (see Tables 1.3 and 1.4). Following the 7 July, 2005 bombings in London, 31% of Londoners reported substantial distress and 32% of Londoners 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.

Table 1.3 Post-traumatic 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

Table 1.4 Health risk behaviors

- Change in smoking
- Change in alcohol
- Balancing home and work
- Disaster behaviors
  - Evacuation
  - Overdedication
  - Adherence to medical recommendations

After September 11, substantial numbers of people wished to stay home and might well have met the diagnosis of separation anxiety.

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 (Rundell & Ursano, 1996). 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), or the ongoing threat of terrorist attacks, or to underlying psychiatric disease such as depression or PTSD (Mellman *et al.*, 1995). Post-traumatic distress must be considered in the differential diagnosis and appropriate treatments initiated.

Hostility with its accompanying social disruption, feelings of frustration, and perception of chaos are also common following disaster (Forster, 1992; Ursano *et al.*, 1995). 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.

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 6 min 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 (Gershon *et al.*, 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 is a lifesaving behavior.

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 (Fullerton *et al.*, 1999; Prigerson *et al.*, 1999, 2000; Raphael