Understanding Citizen Response to Disasters with Implications for Terrorism

Ronald W. Perry* and Michael K. Lindell**

Introduction

Since the September 11 attacks on the World Trade Center and Pentagon in the United States, the mix of authorities attending to emergency management issues has changed. Traditionally, emergency managers were often their communities’ sole voices that were calling attention to needs for mitigation, preparedness, response and recovery planning (Drabek, 1987). Increased awareness of vulnerability to terrorist acts has brought more actors into the arena and emphasized the need for coordination among their efforts. Thus, emergency managers at local, regional and federal government levels have been joined by law enforcement, military and policy makers in examining means of combatting terrorism. Much of this work places terrorism in the general context of understanding human behaviour under stress, logically drawing on the literature of natural and technological disasters. There have been calls for information sharing and cooperative planning among all these groups, and policy officials have added their voices to the process (Hoffman, 2001).

Calls for such coordination are not new. Emergency managers and researchers have, for decades, emphasized the importance of multi-agency co-operation in all phases of hazard management (Dynes, Quarantelli and Kreps, 1972). For that matter, the systematic study of terrorism as a hazard in the United States is also not new; one can minimally trace this work to the efforts of Brian Jenkins at the RAND Corporation in the early 1970s (Jenkins, 2001). What is new is the concerted effort, particularly by policy makers, to make the coordination real and to fund the necessary planning and preparedness measures. In connection with these efforts, another issue - also old in origin - has arisen: some policy makers and planners appear to have expectations about human response to disasters and terrorism in particular that are not compatible with known behavioural principles and with data on human behaviour under emergency conditions. In particular, apparent concern about citizen ‘panic’ and the possibility of other dysfunctional behaviour suggest that policy officials would benefit from a review of what is known about citizen response to natural and technological disasters, and how that knowledge is likely to generalise to terrorist incidents.

The purpose of this article is to review what is known about citizen response to natural and technological disasters, and to extrapolate from that information to describe what might be reasonably expected in connection with terrorist incidents. Certainly there is not a direct translation of results from other types of disasters to terrorist events. Much of the variation will be based in the nature and consequences of the agents used: weapons of mass destruction using incendiary explosives, and chemical, radiological and biological agents. Over many years, the different impacts of specific threats have been studied and it is known that some agents (radiation for example) generate higher and more acute levels of fear than others (Slovic, Fischhoff and Lichtenstein, 1980). Indeed, an often-noted finding from research on the Three Mile Island nuclear reactor accident is that when facing a perceived radiation threat, citizens expressed higher levels of concern and much higher levels of warning co-operation than anticipated by authorities (Lindell and Perry, 1992). The fact that some agents associated with terrorist threats may elicit high fear responses, however, does not negate the utility of a range of research findings regarding human behaviour under stress.

Patterns of Citizen Response

Many lay persons, and unfortunately some emergency managers, appear to believe that people respond to disasters in a socially disorganised and even personally disoriented manner. Decades of ‘disaster’ movies and novels and
press coverage, emphasise the general theme that a few ‘exceptional’ individuals lead the masses of frightened and passive victims to safety. Thus, conventional wisdom holds that typical patterns of citizen disaster response take the form of panic, shock, or passivity (Dynes and Quarantelli, 1976; Perry, 1983).

Social scientific studies have repeatedly demonstrated that none of these responses represents the reaction of the majority of disaster victims (Quarantelli, 1954; Quarantelli and Dynes, 1972; James & Wenger, 1980; Wenger, Faupel and James, 1980; Goltz, Russell and Bourque, 1992; Bourque, Russell and Goltz, 1993; Johnson, Feinberg and Johnston, 1994). Indeed, most citizens do not develop shock reactions, panic flight occurs only rarely and people tend to act in what they believe is their best interest, given their limited understanding of the situation. Most citizens respond constructively to environmental threats by bringing as much information and as many resources as they can to bear on the problem of how to cope with an incident. Behaviour in the disaster response period is generally pro-social as well as rational. Following impact, uninjured victims are often the first to search for survivors, care for those who are injured, and assist others in protecting property from further damage. Anti-social behaviour such as looting is relatively rare, while crime rates tend to decline following disaster impact (Tierney, Lindell and Perry, 2001), and martial law has never been declared as a response to natural disaster in the United States. Indeed, the public-at-large tends to converge on disaster scenes to offer help and even people who are geographically distant routinely donate significant amounts of money and supplies. The picture that emerges of disaster victims is one of responsible activism, attempting self-care, supporting neighbours and ameliorating the situation as best they understand it, using whatever resources available. Victims are typically supported in these endeavours by official organisations and resources, but also by contributions from other households not directly affected by the event.

The myths of irrational and antisocial behaviour in disaster are not just erroneous - they hamper the effectiveness of emergency planning by misdirecting the allocation of resources and the dissemination of information (Tierney, Lindell and Perry, 2001). For example, expectations of citizen ‘panic’ often become the justification for giving the public incomplete information about an environmental threat or withholding information altogether. This response to the myth of panic is particularly troubling because it has been shown repeatedly that people are more reluctant to comply with suggested emergency measures when they are provided with vague or incomplete information (warning messages). Consequently, an important part of the emergency planning process involves review not only of physical or biological science literature on the hazard agent, but also of the behavioural science literature describing the response patterns of affected populations. Because of their relevance in terrorism response planning, we will review the behavioural record on three types of citizen reactions: shock and inactivity (‘the disaster syndrome’), panic flight, and pro-social (socially integrative) responses.

Disaster Syndrome

There have been some documented reports, following disasters, of a condition characterised by a state of shock associated with docility, disoriented thinking and sometimes a general insensitivity to cues in the immediate environment. Perhaps the earliest discussions of this disaster syndrome in social science literature lies in the work of Wallace (1957) and Menninger (1952). Wallace described the shock reactions that characterised surviving victims whose friends and family members had died in assaults on American Indian settlements. Menninger reported on transient ‘apathy, confusion and disbelief’ among some flood victims and other studies conducted between 1943 and 1983 have also identified cases where disaster syndrome symptoms have appeared (Melick, 1985). Three important conclusions have emerged from this research. First, the disaster syndrome or shock reaction appears most frequently in sudden-onset, low forewarning events involving widespread physical destruction, traumatic injuries, or death (Fritz & Marks, 1954; Murphy, 1984; Melick, 1985). Second, when the symptoms do occur, they are relatively mild and are displayed by only a relatively small proportion of the disaster stricken population. Moore (1958) reported that between 17 percent and 30 percent of families exposed to the Waco tornado claimed at least one member (usually a child) experienced ‘emotional upset’. Taylor’s (1977) study of the Xenia, Ohio Tornado reported relatively low rates of reported mental health problems, with ‘trouble sleeping’ leading the symptom frequencies at 27 percent. Fritz and Marks (1954) found that only 14 percent of their random sample showed any evidence of the early symptoms associated with the disaster syndrome. Third, the disaster syndrome is transient in that it usually persists for a maximum of a few hours, rarely being detected outside the immediate post-impact period. This is not to say that no psychological consequences persist. Depending upon the nature and severity of the event and various characteristics of the victim, studies have indicated that situational anxiety, phobia, and
victims' ability to act responsibly on their own or reactions do not seem to interfere with disaster management is that such short-term stress. What is important to emergency responders with minimum (if any) outsider intervention, functional coping mechanisms for these disorders seem to be able to develop in the short- and long-term. Syndrome symptoms appear in distinct minor and major psychological consequences in the short- and long-term. Singer (1982: 248) succinctly summarises empirical findings with the following generalisation: 'Reports of actual experiences reveal that most persons respond in an adaptive, responsible manner. Those who show manifestly inappropriate responses tend to be in a distinct minority. At the same time, most people do show some signs of emotional disturbance as an immediate response to a disaster, and these tend to appear in characteristic phases or stages.'

Disasters of any kind constitute significant life-events for victims. Reactions sometimes documented after natural and technological disasters include sleep disruptions, anxiety, nausea, vomiting, bedwetting, and irritability (Houts, Cleary and Hu, 1988). In some cases, serious psychological consequences such as extended grief reactions, depression and psychoses ensue (Erikson, 1976). Awaiting systematic data, one can speculate that terrorist events - in part designed to generate fear - hold a higher likelihood of generating long-term impacts, in part because they fit the profile of being sudden, without warning, creating physical destruction and death, and lacking apparent 'rational' explanation. Some of the common disaster syndrome symptoms, however, are probably associated with longer-term onset problems and difficult to directly attribute to the incident experience. Thus, the disaster experience itself may become a 'trigger event' for symptoms with genesis outside the disaster.

For the most part, citizens presenting disaster syndrome symptoms seem to be able to develop functional coping mechanisms for these disorders with minimum (if any) outsider intervention. What is important to emergency management is that such short-term stress reactions do not seem to interfere with disaster victims' ability to act responsibly on their own or to follow instructions from emergency response officials. Isolated cases of shock are reported among some citizens in some disasters, but such reactions are relatively rare and certainly could not be described as typical of the population as a whole (Wert, 1979). Indeed, Gerrity and Flynn (1997: 103) concluded that the psychological impacts of disasters can be described in terms of 'normal people, reacting normally, to an abnormal situation.' On the other hand, the non-zero prevalence of mental disorder in populations generally and the non-zero incidence of long-term psychological reactions to disaster incidents demands that responsible authorities work with mental health professionals to monitor psychological consequences in the post-impact period. In summary, disaster shock is a topic of significant theoretical interest to disaster researchers and of practical relevance to health professionals, but emergency managers should be aware that this reaction occurs so infrequently that it is of negligible significance for emergency operations.

Panic

An even more stubborn myth regarding human behaviour in disasters is the idea that panic flight is a major problem in hazard management. In general, 'panic can be defined as an acute fear reaction marked by a loss of self-control which is followed by non-social and non-rational flight' (Quarantelli, 1954: 272). While such panic flight is a staple of horror books and movies, and periodically is mentioned in connection with crowd behaviour (for example, in riots after soccer games), it is a rare response to natural or technological disasters. It is important to also emphasise that 'panic flight' is not the same as a 'fear reaction' or anxiety.

The pervasive myth of panic flight in response to disasters is perpetuated by a set of erroneous inferences from the available information people have about disasters. First, people tend to think that panic is common because victims often label their immediate reaction to the situation as one of 'panic' when interviewed in the news media. Careful scrutiny of these victims' statements ('When I saw the funnel cloud, I panicked.') indicates that they are referring only to the first of Quarantelli's conditions - the acute fear reaction. Subsequent statements describing rational (and often pro-social) protective responses ('...so, I grabbed the baby out of the upstairs bedroom and ran down to the basement just before the house collapsed.') are often ignored. A second reason that panic is thought to be common is that observers misinterpret the state of mind of disaster victims who took unsuccessful actions. For example, a news story may assert that the victims of a motel fire found dead in a hall...
storage closet got there because they ‘panicked.’ A more plausible explanation is that in crawling through the zero visibility heavy smoke, the victims reasonably but erroneously concluded that the first unlocked door they encountered in this unfamiliar hallway was the door to the stairwell. Once they realised their mistake, it might have seemed safer to shelter in the closet (fire safety instructions typically recommend sheltering in rooms) or their exit may have been blocked by the sure peril of advancing flames. In short, the fact that an error of judgement has produced fatal consequences does not provide prima facie evidence of panic.

Indeed, even when disaster victims are successful in avoiding death, observers often interpret any attempt to flee the hazard as evidence of panic. Yet, in light of Quarantelli’s definition of panic, it is difficult to see why anyone would assume that it is not rational to want to put distance between oneself and a fire, or to move quickly to leave the vicinity of crumbling buildings following an earthquake or terrorist bombing. In these cases, those affected are assessing a threat in the environment and coping with this threat (and their fear as well) by taking an appropriate protective action. Their response should not be classified a panic if they have some realistic probability of protection (i.e., flight does not meet Quarantelli’s criterion of non-rational behaviour) and avoids harming others (i.e., flight is not non-social).

Of course, we do not claim that all reports of panic flight can be explained away as observer errors. Though panic flight is rare, research dating back to the early 1950s indicates that there are several conditions that must occur, probably simultaneously, in order to evoke it (Fritz, 1957; Mileti, Drabek and Haas, 1975; Quarantelli, 1957). These are: (1) the perception of immediate and severe danger; (2) the existence of a limited number of escape routes; (3) the perception that the escape routes are closing, necessitating immediate escape; and (4) a lack of communication about the situation. We emphasise that these conditions are defined in terms of the individual’s perceptions or beliefs; thus the conditions are based on what those at risk believe to be true at the time, not upon what the emergency managers know after the fact. It is also important to note the distinction between the occurrence of an event and the potential for dangerous consequences resulting from that event. In this connection, Quarantelli (1954: 274) has observed that:

‘Coal miners entombed by a collapsed tunnel who recognise they will have sufficient air until rescuers can dig through to them do not panic. [Panic occurs in reaction] to the immediate dangerous consequences of possible entrapment rather than to being trapped as such.’

It also should be remembered that even in cases where conditions for panic flight exist, it does not always materialise. Johnson (1988) reported that during the 1977 Beverly Hills Supper Club fire in Kentucky (where 160 patrons died), the evacuation was orderly and altruistic responses were common. Similar findings have been reported in other fires (Canter, 1980; Keating, Loftus and Manber, 1983; Johnson, Feinberg and Johnston, 1994). Furthermore, Aguirre, Wenger and Vigo (1998) reported that the evacuation of the World Trade Center in 1993 was tense but orderly, with no reports of panic flight. In summary, panic is not entirely unheard of in response to natural or technological disasters, but it is not a common or frequently observed reaction to any type of disaster. When panic flight is observed, it seems to involve a relatively small proportion of the people exposed to the threat and does not usually persist for any period of time.

Socially Integrative Responses

Since Fritz and Mathewson (1958) coined the term ‘therapeutic community’, it has been known that disasters often produce a shift in values and norms that results in socially integrative responses. Wenger (1972) documented that disasters cause a nearly complete termination of socialising and social participation (e.g., clubs) activities, nonessential activities associated with production-distribution-consumption (e.g., luxury goods) and social control problems (e.g., minor traffic offences, domestic disputes). At the same time, there is usually an increase of mutual support functions among victims and others in stricken communities (Wilmer, 1958; Fritz, 1961; Boileau et al., 1979). Those phenomena characterise what Barton (1969) has called the altruistic community and what others have referred to as the therapeutic community response (Fritz, 1968; Midlarsky, 1968). We have mentioned previously that disaster victims often initiate such activities as emergency first aid, and search and rescue, rather than passively await intervention by governmental authorities. It is also known that non-victims in the disaster impact area engage in helping behaviour directed at victims. Thus, at least in the immediate post-impact period, it has been observed that disasters have integrative effects upon the ‘community of sufferers’ and, in the short, run promote cohesion among victims, as well as between victims and citizens in unaffected areas of the community.

The therapeutic community response is related to convergence behaviour in disasters, which accompanies virtually all disasters and is always a challenge for local emergency managers. Convergence takes place when a stricken community becomes the focus of an aid-giving effort on the
part of surrounding communities and individuals, larger political entities (counties, states and the federal government) and private organisations. The aid takes both material and human form (volunteers). The positive impact of convergence can be seen in the increase of local authorities’ resource base for emergency management and also upon the morale of victims. Victims interpret the presence of such help as evidence that the consequences of the disaster are not totally overwhelming and that, indeed, catastrophe is something that can be overcome.

Although the influx of personnel and materials can provide local emergency managers with the resources needed to respond effectively to the demands of the disaster, convergence can produce unprecedented communication and response difficulties. For example, Kartez and Lindell (1989) described a Louisiana air crash where fire departments from distant communities appeared at the crash site, creating a serious strain on the local authorities’ ability to cope with the crash and also to provide the logistical support for the unneeded responders. Similarly, unsolicited materials may arrive unannounced soon after the disaster impact and continue to arrive long after the situation has stabilised. Thus, emergency managers need to be aware of the convergence of human and material resources. Convergence processes can inundate emergency managers with unanticipated people and materials, converting assets to liabilities. It is clearly important to develop disaster plans that allow for appropriate integration of volunteers into the response force, the management and care of volunteers, and the logistics of receiving, deploying and storage of materials.

A second aspect of pro-social response can be seen as dealing with a more general sympathetic behaviour on the part of non-victims that is related to, but distinct from the convergence response. We are referring here to the volunteering of direct help to victims in the form of needed clothing, food and lodging. Perhaps the earliest documentation of this type of response is found in Prince’s (1920: 137) study of an explosion in Halifax, Nova Scotia, where he points out that:

‘The idea spread of taking the refugees into such private homes as had fared less badly. It became the thing to do. The thing to do is social pressure. It may be unwilled and unintended but it is inexorable. It worked effectively upon all that had an unused room.’

Since the time of Prince’s study, a considerable literature has developed on the extent to which disaster victims depend upon the helping behaviour of non-victims in the community (Midlarsky, 1968; Vallance and D’Augelli, 1982; Watson and Collins, 1982; Young, Giles and Plantz, 1982; Lindell and Perry, 2003). Particularly in Western societies, such helping behaviour directed at (and among) victims can be a normative response. This is not to say that these naturally occurring social processes provide complete support for victims or that they entirely mitigate the negative psychological consequences of disaster impact. Both natural and technological disasters are calamitous experiences for many victims. At least in the near term, terrorist events can be expected to elicit extreme outpourings of help to the perceived blameless victims. The scale of giving following the September 11 attacks stands as an extreme example.

Our concluding comment about pro-social actions and their effects concerns the persistence of the therapeutic community response over time. Some authors conceive of the therapeutic community as ‘an outpouring of altruistic feelings and behaviour beginning with mass rescue work and carrying on for days, weeks, possibly even months after the impact’ (Barton, 1969: 206, emphasis added). Regrettably, research on the persistence of the therapeutic community response has been insufficient to permit confident acceptance of Barton’s hypothesis of long-term persistence. As Dynes and Quarantelli (1976; see also Quarantelli and Dynes, 1977) suggest, the therapeutic community may not be an enduring condition. Although their work does not directly test Barton’s proposition, they have found that decreases in community conflict and the apparent increase in community consensus following disasters are short-lived phenomena. Indeed, other research clearly documents the emergence of social and political conflict during disaster recovery (Tierney, Lindell and Perry, 2001). While the empirical record is too sparse to support specific time estimates, some conflict regarding the distribution of contributed funds and materials began to arise within six months following the September 11 attacks. Thus, emergency managers planning for the recovery period are well advised to remember that the duration of situational therapeutic norms is limited. It also is essential for them to recognise that disasters cause indirect positive effects as well as the more direct, and certainly more widely known, negative psychological impacts.

Public Response in Terrorist Incidents

The definition of terrorist incidents varies among emergency managers and social scientists (Buck, 1998). In recent years, emergency managers have concentrated upon the magnitude and agent of destruction rather than focus on actors or motivations in identifying terrorist events. In 1997, the United
States Department of Health and Human Services Public Health Service initiated the development of Metropolitan Medical Response Systems (MMRS) with the specific aim of enhancing the capability of municipal governments to respond to the consequences of terrorism incidents. Each MMRS is a comprehensive, intergovernmental structure integrating multiple agencies. Typically, though not universally, the agencies represented on an MMRS include those with EMS skills, public health jurisdiction, fire suppression ability, hazardous materials management capabilities, law enforcement authority, and extended medical care capability. The Phoenix, Arizona MMRS, for example, incorporates fire department disciplines (fire suppression, hazardous materials management, technical rescue), law enforcement (city, county and state), emergency medical services, private sector hospitals and toxicologists (Poison Control Centers), county level agencies (emergency management, public health and medical examiner’s), state agencies (emergency management, environmental protection, health departments, and laboratories), and liaison to related federal agencies (Federal Bureau of Investigation, Centers for Disease Control and Prevention, Public Health Service, and others). The objective of an MMRS is to provide comprehensive intelligence, threat monitoring, threat detection, and incident response and recovery. In MMRS planning and subsequent support for MMRS cities provided by the Department of Defense and the Department of Justice - terrorist incidents are distinguished as those involving the use of weapons of mass destruction (WMD), where the agent was an explosive, chemical, radiological, or biological agent. Although the purpose of the MMRS program was initially to develop a system for successfully treating 1000 or more casualties from a WMD incident, the defining features of an incident addressed the intent and the capability of the agent to generate casualties rather than the actual number involved. More than 150 large U.S. municipalities currently have active MMRS capabilities, with more cities in the development phase. This obviously means that the MMRS program covers only a fraction of municipalities at risk, but other planning for smaller jurisdictions uses the framework for equipment, capabilities and organisation that originated with MMRS plans. Consequently, from a practical standpoint, the model for terrorism management devised under the Department of Health and Human Services MMRS approach remains the principal approach in the United States.

Within the MMRS concept of the defining features of terrorist incidents, two issues are involved in understanding what citizen responses can be expected by emergency managers. The first challenge is to understand how citizen response to natural and technological disasters applies to terrorism. This can be addressed by extrapolating likely general response patterns from the literature reviewed above. The second issue is tied to understanding the agent-generated and response-generated demands that are unique to WMD events.

**Extrapolating Citizen Responses to Terrorism**

An appropriate inference from the disaster literature reviewed above emphasises that citizens confronted with disaster are thinking, reacting being who tend to not be frozen in fear, to not engage in panic flight, and to not engage in irrational behaviour. The more typical behaviour of people facing a threatening situation is that of the passengers on United Airlines Flight 94 who, once they understood the threat, organised and attacked their hijackers. Understanding the nature of victims’ responses makes possible several important observations about the management of terrorist threats by local authorities.

The first recommendation is to expect fear - not panic flight, debilitating shock, or senseless behaviour. Fear is a normal human reaction to extreme environmental conditions. It rarely results in the inability to act, but does degenerate one’s ability to effectively reason through complex problems. Anxiety is especially enhanced by the unfamiliar. Terrorist events that involve the use of chemical, biological and radiological agents by definition introduce the unfamiliar; many of the WMD agents are undetectable by normal human senses and produce both immediate and delayed negative outcomes. People’s knowledge about such agents is very limited, and the data available on perceptions of radiological threats indicates that the fear that accompanies their presence is substantial (Slovic, Fischhoff and Lichtenstein, 1980). It is important for emergency managers to address these fears as soon as an incident has taken place by disseminating information about the hazard and recommended protective actions. One need not try to give those at risk a broad education about these topics, just specific relevant information. Officials should focus on defining the threat, explaining its human consequences, and explaining what can be done to minimise negative consequences. If the actions to minimise the consequences cannot be undertaken by individuals, but must be executed by authorities, then one explains what is being done. Contrary to popular fiction, the road to anxiety reduction is through providing - not withholding - information.

A second recommendation is to expect citizens to take action. Authorities need to understand that people who are informed of a danger will
undertake any feasible actions that they believe will reduce that danger. It is therefore important that official messages include recommended actions. If authorities do not provide suggested actions, citizens will take action anyway - devising the most `reasonable' protections they can imagine with the resources available to them. A message not accompanied by constructive suggestions for action simply enhances fear, which itself cannot be salved without information and action. When providing protective action recommendations, it is also critical to briefly link the action with protection for the citizen. Telling citizens why evacuating an area will reduce their exposure to smallpox, or why taking potassium iodide will reduce radiation exposure damage accomplishes two important objectives. First, it increases compliance by those at risk, and second, it discourages them from taking other actions that seem to be effective but are not.

A third recommendation is for authorities to expect compliance from citizens, particularly when a geographically defined scene is present and disaster onset is rapid (Lindell and Perry, 1992). In times of extreme stress, citizens look to government for guidance. When the agent of destruction is unfamiliar or intangible, or when the consequences appear overwhelming, people expect protection. National opinion polling following the September 11 attacks indicated substantial increases in levels of `trust in government' (Brennan, 2002). An unfamiliar threat will generate protection motivation, attention to messages from emergency managers, and a disposition to comply with official recommendations. Although people tend to return to `normal' attitudes toward government and scepticism over time, there is a window of opportunity for emergency managers during the height of crisis and for some period thereafter. During the response phase to WMD, citizens might be willing to comply with even unusual protective action recommendations from police and fire personnel. For example, during a recent incident in Phoenix, Arizona, women who were believed to have been exposed to anthrax underwent nude decontamination by male hazardous materials technicians in an unroofed decontamination shelter while news helicopters hovered above. One person mentioned the issue of modesty, but none hesitated to follow instructions. Since that time, the Phoenix MMRS has acquired more suitable decontamination shelters and the ability to deploy `all female' decontamination teams, but the incident stands as an example of citizen compliance with emergency instructions and trust in emergency authorities. The expectation for compliance places a special responsibility upon local authorities to establish response plans promptly and effectively. In the absence of such plans, citizens will hold authorities responsible through the political process.

Finally, while the research record demonstrates that psychological consequences rarely result in citizen inability to respond in the short-run, authorities must remember that the experience of any disaster does have long-term consequences for some of the victims (Perry, 1985). In particular, traumatic responses are possible - even post-traumatic stress disorder - and other difficulties can be manifest in psychological responses, particularly depression and sometimes `survivor syndrome'. The research literature shows that such long-term consequences are more likely to arise among: (1) people who have witnessed death or handled the dead; (2) people who have been exposed to large scale property destruction; and (3) people whose relatives, neighbours or friends have been seriously injured or lost their lives. Particularly in terrorist events where victims often bear no obvious relationship to perpetrators, individuals experience long-term anxiety, guilt and depression. Even in the absence of death of significant others or direct contact with death, loss of property and other negative economic consequences associated with it can produce depression. As authorities move from hazard monitoring through emergency response to disaster recovery, the potential for longer-term psychological consequences should be considered. Thus, recovery plans should include provisions for `crisis' and other short-term therapeutic contact as a means of reducing long-term negative consequences for the affected population. Consequently, attention also should be given to citizen needs for developing a sense of closure and a coherent explanation for the disaster experience that facilitates a transition to a stable life.

Challenges posed by WMD Incident Characteristics

When emergency managers plan for WMD incidents, the standard practice is to envision a geographically identifiable risk area and an event with a distinct beginning and end. This model is quite suitable for natural disasters and technological accidents, but only partially fits terrorist attacks. Terrorist attacks using explosives, or some chemical agents create a scene in a bounded geographical space. Thus, there is a place where there is visible physical damage and easily identified victims and, conversely, areas that are clearly not affected by such impacts. However, other hazardous materials events and terrorist events involving the secret release of radioactive or biological agents could present different challenges to emergency managers. In these cases, there might be no immediate environmental cues that are immediately detectable either by victims or by emergency managers.
Recognition that exposure has occurred might come only later when victims are identified through symptoms; for some biological agents the time lag between dispersion and detection may be considerable. One commonly used biological agent scenario describes detection of a large number of symptomatic individuals over an extended period of time, which then demands epidemiological investigation to work backward to identify the original site and time of infection, and at the same time tracks symptomatic individuals (vectors) to project future exposures. Situations like this one do not present an identifiable single scene for operations and may defy all but the vaguest identification of the beginning and end of the incident.

With the uncertainty that might accompany definition of some terrorist attacks and their impact, emergency authorities can more effectively conceive of the planning process in terms of agent-generated and response-generated demands (Quarantelli, 1977). Demands generated by an agent are those related to specific mechanisms for creating damage or harm, while response-generated demands are those associated with mounting and maintaining a response. Lindell and Perry (1992) have elaborated this distinction in terms of four principal activities required in incident management: emergency assessment, expedient hazard mitigation, population protection (which correspond roughly to what Quarantelli has identified as agent-generated demands), and incident management (which is roughly equivalent to Quarantelli’s response-generated demands). Emergency assessment consists of those diagnoses of past and present conditions and prognoses of future conditions that guide emergency personnel in their efforts to stop damage and limit the magnitude of negative consequences on persons and property. Expedient hazard mitigation refers to actions taken by emergency personnel to limit the magnitude of the disaster impact (sandbagging a flooding river, fighting a fire or patching a leaking railroad tank car). Population protection refers to actions - such as evacuation and search and rescue - taken to prevent or minimise exposure of individuals to the hazard. Incident management consists of the activities by which the human and physical resources used to respond to the emergency are maintained and controlled to accomplish the goals of the emergency response effort. Depending upon the type of WMD agent involved, one can expect variation in the ability of emergency managers to perform these functions and the manner in which the functions are performed. In turn, this state of affairs impacts the way in which emergency managers must plan to approach terrorist threats. The point can best be illustrated by examining different WMD agents and some of their implications for the four functions.

Emergency assessment in connection with WMD events is often labelled ‘threat assessment’ by law enforcement and intelligence agencies. Emergency assessment in natural and technological hazards has guided planning by using information about past events and hazard characteristics to forecast future events and define appropriate protective actions (Drabek, 1990). In the realm of terrorism, emergency assessment is more difficult and complex. In the first place, the genesis of terrorist incidents lies with reasoning individuals, rather than probabilistic forces of nature or technology. Observation of past terrorist incidents is of marginal utility (except in the most general terms) for forecasting the nature of, and planning responses to, future events because there are no reasonable models by which the frequency and characteristics of past events can be extrapolated to accurately estimate frequency and characteristics of future events. For some WMD agents - explosives and hazardous chemicals - past experiences provide general guidance for the design of response actions. For example, the Oklahoma City Bombing and the September 11 attacks have underscored the need for local heavy rescue capability and for handling large numbers of injured and dead victims. For radiological incidents, there are no examples of terrorist attacks and the next most similar incidents - nuclear power plant accidents and World War II bombings - provide limited guidance. The number of biological agent incidents has been small (most recently, mailed anthrax spores in the United States), so the range of biological agents and the mechanisms of delivery are so large as to make generalisation very difficult. Emergency assessment for WMD is not only difficult and tentative, but also is a task that demands novel linkages among agencies. Law enforcement and intelligence agencies, which have the responsibility for identifying and monitoring terrorist groups, have rarely worked with public health agencies (e.g., Centers for Disease Control and Prevention, state and county health departments) who are responsible for conducting emergency assessment for biological agents. Effective emergency management for bioterrorism requires law enforcement, intelligence and public health agencies to convey the results of the emergency assessments to emergency managers, fire departments and hospitals which, in turn, must translate these results into actions that can minimise human exposures and their consequences.

In addition to the enhanced need for communication and information sharing, the nature of the available information has implications for WMD emergency planning. The vagueness of the information gained from past events, together with the difficulty of gaining meaningful data to project terrorist motivation and event genesis,
impedes the structuring of operations aimed at reducing damage, contamination, and casualties. At this point, expectations of types and magnitudes of danger must be translated into their broadest possible implications, resulting in consideration of a conservative (and large) number of potential measures to be undertaken by emergency managers and responders. This path increases the cost and logistical demands upon emergency responders and exposes citizens to a wide range of measures, some of which will prove to be appropriate and necessary and others not needed. For example, the Aum Shinrikyo attack on the Tokyo subway in 1995 underscored the degree to which variation in agent quality and diffusion effectiveness affects population exposure. Cult members carried bags of the liquid form of the nerve agent sarin onto subway cars and cut the containers as a means of initiating the threat. Although sarin is extremely lethal, the attack resulted in only twelve deaths and approximately 1,046 patients being admitted to hospitals (Reader, 2000). If the sarin had been effectively aerosolised, the death and injury rates could have been substantially higher. It is inappropriate to assume that future chemical attacks will also fail to achieve effective diffusion. Thus, the basis of planning must assume some degree of successful dispersion and structure local emergency response appropriately.

WMD threats also present unique planning challenges in connection with hazard mitigation - actions taken by emergency responders to reduce human and property damage. Of concern here is not so much the specific mitigation measures that might be employed, but the conditions under which they must be executed. In terrorist attacks where a geographically defined scene does exist, a major distinction is that the area is officially a ‘crime scene’. That is, once the human consequences are mitigated and structural stability is achieved, the scene becomes the focus of law enforcement efforts to reconstruct the agent and seek clues to the identity of perpetrators. For this reason, emergency responders (fire, hazardous materials technicians, emergency medical services, and heavy rescue personnel) must accomplish their life-saving goals while being vigilant for potential evidence, notifying law enforcement to its presence, and assisting with its preservation. These activities are not ‘normal’ components of incident management systems (Brunacini, 2002), and require preplanning on the part of non-law enforcement responders as well as communication and integration of operations with law enforcement personnel.

A related hazard mitigation challenge lies in the possibility that terrorists may, in addition to creating an incident designed to injure the public, also include so-called ‘secondary devises’ as a means of injuring and disrupting emergency responders. More than 300 fire-fighters responding to the 2001 attack on the World Trade Center were killed in the building collapse. This consequence - coupled with the destruction of the city emergency operations centre - seriously hampered response operations. In this case the large loss of emergency responders was presumably not anticipated in the planning of the attack. However, it is known that other terrorist attacks have deliberately targeted first responders with ‘secondary explosive devices’ (Buck, 1998; Jenkins, 2002). Consequently, strategies for incident management in terrorist events must include procedures for seeking, identifying, and neutralising secondary devices at the scene. First responders, who are trained to react quickly, often chafe at such measures and consider them to be unnecessary delays. Thus, training and drills must be designed to create disciplined response rather than quick response.

Population protection in WMD attacks is also potentially more complex than in many conventional disaster settings. In protecting the population at risk, disaster management has traditionally relied upon one of three actions: (1) quickly contain and abate the threat at the scene; (2) move those at risk away from the threat by prompt evacuation; and/or (3) provide instruction so that those endangered may shelter in-place. The choice of which action or combination of actions to implement typically depends upon the state of technology relative to the threat and the characteristics of the threat itself. We have already mentioned that terrorist threats may involve no scene or many scenes, thereby complicating the notions of quick containment and abatement. Also, some terrorist incidents will employ agents that are difficult or impossible (given existing medical knowledge technology) to abate. The use of evacuation and protection in place also raise issues of citizen compliance that have been addressed, but not well answered, in connection with nuclear power plant accidents (Lindell and Perry, 1983) and chemical accidents (Wilson, 1987, 1989). That is, will public confidence in emergency authorities and protective measures be sufficient to insure public compliance? In the case of an infectious biological threat, with visible casualties in a community, will citizens ordered to quarantine in their homes actually believe this measure will be more efficacious than the alternative of putting distance between themselves and the apparent locus of the agent? On the other hand, will citizens asked to evacuate an area to escape a radiation hazard believe that moving apparently unprotected in a vehicle in the presence of radiation is more protective than sheltering at home? In either case, there is considerable potential for public refusal to comply with measures suggested by authorities. Lindell and
Perry (2003) have argued that even counter-intuitive protective measures can be successfully implemented, but to do so requires substantial pre-event risk communication on the part of authorities. To date, at least in the United States, public risk communication regarding biological, chemical and radiological agents that might be used by terrorists has tended to be sporadic and not well co-ordinated across agencies or levels of government.

Incident Management - maintaining and controlling resources for emergency response - constitutes a particular challenge in terrorist planning. Certainly there is an issue of magnitude relative to other disaster events because there could be an extremely large number of immediate victims and population at risk of exposure, not to mention a large number of emergency responders and a substantial amount of equipment. Initially, the U.S. Department of Health and Human Services developed the MMRS program on the assumption that there would be a need to manage as many as 1000 victims. After the 2001 World Trade Center attacks, it was clear that the numbers of deaths and injuries could be substantially higher. Thus, MMRS cities are now encouraged to maintain a capability for prophylactic treatment of 40,000 victims and exposed individuals. But the size of the response in itself is not exclusively unique; natural and technological events can sometimes generate similar levels of casualties. An important corollary of event magnitude is that terrorist incidents involving WMD will almost certainly exceed the response capacity of the community in which they take place and this could take place very quickly. This raises another important emergency management challenge - material convergence. Thus, even though the local system must be designed to accumulate materiel to ameliorate initial needs, it is likely that the local supplies will soon be exhausted. The U.S. Federal Response Plan insures that supplies can be made available, but an effective local system must be devised to receive, package and deploy such outside resources. The meshing of local and extra-community systems has always been difficult in disasters, but is will be a critical element of successful response to terrorist incidents. Tactical preplanning must therefore include not only co-ordination with federal resources but, in the event federal resources are delayed or unavailable, plans must address regional resources through such mechanisms as mutual aid, automatic aid, and other agreements.

More specifically, the unique agent demands arising from biological, chemical and radiological threats also complicate incident management. All of these agents potentially require special treatments for victims and special protections for both the public and emergency responders. Hence, for nerve gas attacks, stores of drugs such as atropine, 2-pam chloride and diazepam are needed as antidotes or treatments for symptomatic patients, and substantial personal protective equipment is required for emergency responders. Similarly, with some biological agents, antibiotics must be available both for symptomatic victims and non-symptomatic but exposed members of the public. Particularly with contagious biological agents, emergency responders’ needs for protective clothing for are stringent. While radiation exposure is not considered a medical emergency, emergency responders working in such environments require protective garb, some prophylactic drug therapies (e.g., potassium iodide) may be used for both responders and the public, and effective treatment of severe radiation exposure is medically complex. Furthermore, if radiation exposure is achieved via an explosive device, traumatic injuries and contamination can arise. In all three classes of WMD, emergency responders, equipment, victims and exposed population segments may require extensive decontamination.

These conditions impose at least three special complications for incident management. First, pharmaceuticals require special credentials for acquisition and use, and they expire (or their efficacy depreciates) with time. Thus, emergency authorities need medical support in the planning and response process, special equipment must be acquired to safely and effectively store drugs, and a comprehensive system must be devised to monitor, rotate and replace expired pharmaceuticals. These logistical complications are further exacerbated by the high cost of pharmaceuticals. Second, the acquisition and maintenance of personal protective equipment (PPE) creates serious logistical challenges. In WMD biological and chemical events particularly, safe operations require that a very wide range of responders be provided with PPE that affords a higher level of protection. For example, both hazardous materials technicians and law enforcement officers operating in a ‘hot zone’ around a nerve gas release will require completely encapsulated suits (Level A PPE). Moreover, emergency responders operating outside the zone where the agent or device is isolated will also require protection such as self-contained breathing apparatus (SCBA) and protective clothing. Such personnel would include those performing decontamination, medical treatment, ambulance transport, law enforcement investigation, and scene security. The problem here is that more people need more (expensive) PPE, some of which is ‘single use’. Fully encapsulated suits, for example, must continually be checked (for function, leakage, etc.), and some (body armour) naturally decays with time. Virtually all PPE requires special fitting...
and therefore can only be used by the individual for whom it is fitted (denying sharing of equipment among multiple responders). PPE is not only costly, but also demands the creation of systems to monitor effectiveness, insure fit and manage periodic replacement. A third complication concerns the use of PPE. Although hazardous materials technicians and bomb technicians routinely train and respond in bulky PPE, this is not true for most other emergency response personnel—particularly law enforcement and medical personnel. This means that people conducting decontamination, rendering medical care, maintaining scene security, and conducting scene investigation must be trained to execute familiar tasks while wearing unfamiliar and constraining protective equipment.

Conclusion

In closing, it is important to emphasize that citizen response to terrorism incidents is not unpredictable. What can be expected of victims and citizens can be in large part extrapolated from the decades-long literature on human response to natural and technological disasters. In the short run, particularly at a scene, authorities can expect citizens to feel frightened by to be rational (within their limits) and for most people to co-operate with protective action recommendations. The burden that these likely reactions place upon civil and emergency authorities is straightforward: effective planning must be undertaken to provide realistic protections to the public. Within the boundaries of technical knowledge and government responsibility, it is certainly possible to engage in planning that will enable meaningful response. The process is complicated by the agent- and response-generated demands particular to WMD. These complications make both planning and response more extensive, more complex and, therefore, more expensive. The challenges can be overcome, but the task will be much more difficult if planners and policy makers fail to take into account the accumulated knowledge that already exists about human and organisational behaviour in disasters. Emergency management that is not based on accurate knowledge of both the threat and principles of human response is destined to fail.

References


Dynes, R., Quarantelli, E.L. and Kreps, G. (1972), A Perspective on Disaster Planning, The Ohio State University Disaster Research Center, Columbus, OH.


Mileti, D., Drabek, T. and Haas, J. (1975), Catastrophe and social change, Columbia University Faculty of Political Science, New York, NY.


Wenger, D.E., Faupel, C. and James, T. (1980), Disaster Beliefs and Emergency Planning, University of Delaware Disaster Research Center, Newark, DE.

Wert, B.J. (1979), Stress Due to Nuclear Accident, Occupational Health Nursing, Volume 27, pp. 16–24.


