

O'Leary M (2004) *The First 72 Hours: A Community Approach to Disaster Preparedness*. Lincoln (Nebraska), iUniverse Publishing.
http://www.iuniverse.com/bookstore/book_detail.asp?&isbn=0-595-31084-2

27

Common Misconceptions about Disasters: Panic, the “Disaster Syndrome,” and Looting

Erik Auf der Heide

** This paper represents the opinions of the author and not necessarily the policies or positions of the Agency for Toxic Substances and Disease Registry or the U.S. Department of Health and Human Services. As a document compiled by a federal employee, this paper is exempt from copyright protection and may be reproduced without permission.*

Introduction

Disaster planning is only as good as the assumptions on which it is based. Unfortunately, this planning is often based on a set of conventional beliefs that has been shown to be inaccurate or untrue when subjected to empirical assessment. (1–3) To the extent that this occurs, responses can be dysfunctional rather than adaptive. The purpose of this paper is to identify a few of the more common misconceptions about disasters and show how they can lead to ineffective responses. Because most field disaster research studies have been carried out in the United States, the discussion will focus on lessons learned from domestic disasters, although some nondomestic examples will be included. Although evidence suggests that some of these findings may apply to disasters worldwide, one must be cautious in extrapolating the data because of the social, cultural, economic, and political differences in other countries.

Community Resilience, Not Social Breakdown

When people think of disasters, the common image is one of social breakdown.

Because of the frequency, vividness, and potential significance of disasters, a number of widespread stereotypes have developed about behavior in disaster. The popular image of disaster has often centered on the theme of personal chaos. Such an image is frequently documented by isolated anecdotes used to prove the universality of such behavior. This image suggests that individuals panic and that individuals lose their concern for others.... They act irrationally in terms of their own self interest. Also, as the result of the disaster experience, it is suggested that people become hostile and take aggressive action toward others. Another facet of the image suggests that victims develop a "disaster syndrome," a docile, childlike condition, and as a result must be "cared for" by some protective organization, acting in a parental way.... At the community level, the image of a "social jungle" prevails. People, hysterical and helpless, gradually shed the thin veneer of civilization and exploit others. It is said that looting is common and outside authority is perhaps necessary in order to inhibit these resurgent primitive urges. It is assumed that many will flee from the disaster area in mass panic, leaving the community stripped of its human and natural resources. (4)

Disaster research studies demonstrate that this image is believed by the public, by members of emergency and public safety organizations (for example, by police and fire departments, the American Red Cross, and the military), by governmental officials, and by the news media. (3, 5) Even when interviewees have denied seeing such behavior in their *own* disasters, some of them have viewed this as atypical—as the result of the extraordinary spirit and courage unique to their own community—rather than as characteristic of disasters in general. (3) Unfortunately, as we shall see, decision making based on these beliefs can lead to inappropriate responses and an inefficient use of available resources.

In contrast, researchers have found—at least in the immediate aftermath of disasters—that community resilience and unity, strengthening of social ties, self-help, heightened initiative, altruism, and prosocial behavior more often prevail. In short, when things are at their worst, disaster-stricken communities tend to rise to the occasion. One possible exception is that community unity may be decreased in chronic technological disasters involving hazardous substances. (6–10) It is also important to point out that dysfunctional and antisocial behaviors can occur in disasters. For example, people can panic, and one should not expect that crime will completely disappear in high-crime inner-city areas when there is

a disaster. The point is that antisocial behaviors are uncommon in typical disaster situations. (11, 12)

The Panic Misconception

Definition of Panic

The issue of panic in disasters is frequently clouded by a lack of understanding of what the term means. The word is often very loosely and incorrectly used to describe virtually any type of fear, flight, or uncoordinated activity. (13–15)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, 1995. A fire department official involved in the emergency response reported, “Absolute unrestrained panic was rampant in the building during the first hour to hour and a half of the incident. The building had so many access points that it was very difficult to keep anyone from *entering* [italics added]. (16)

Survivors of disasters have characterized their behavior and that of others as “panic,” when what they are really experiencing or observing is rational behavior based on fear. (17) It is appropriate to experience fear in a crisis, and fleeing from a disaster is often the most rational course of action. (18) Panic, on the other hand, involves irrational, groundless, or hysterical flight that is carried out with complete disregard for others. (17, 19, 20) Most people evacuating in a disaster assist others to get away. (18) For example, in Denver, Colorado, in a 1965 flood, residents were threatened by rapidly-rising flood waters, and 92% of the families who evacuated left together. (18)

Several conditions must usually be present simultaneously to trigger panic. (6, 13, 21)

- The victim perceives an immediate threat of entrapment in a confined space.
- Escape routes appear to be rapidly closing.¹
- Flight seems to be the only way to survive.
- No one is available to help.

1. When escape is impossible (as in a sunken submarine or a collapsed coal mine), people do not tend to panic.

Rarity of Panic

Because this combination of conditions is so uncommon in disasters, panic is also quite rare. (6, 7) When panic does occur, it usually involves few persons, is short-lived, and is not contagious. (21) In studies of more than 500 events, the University of Delaware's Disaster Research Center found that panic was of very little practical or operational importance. (21, 22) A number of systematic studies of human behavior in disasters have failed to support news accounts of widespread panic. (5, 8, 23–26)

P. G. Wood (27) used interviews and questionnaires to gather information from more than 2,000 persons involved in 952 building fires. Of these fires, slightly more than 50% occurred in houses, 17% in factories, 11% in multioccupancy residences, 7% in shops, and 4% in institutions such as schools and hospitals. He found that there were three general types of reactions to these fires: (1) concern with evacuation of oneself or others, (2) concern with containing or fighting the fire, and (3) concern with warning others and notifying the fire department. The majority of occupants appeared to have behaved adaptively. Although some 5% of respondents took actions that increased their risk, evidence of irrational, antisocial behavior was lacking.

Canter et al (28) carried out extensive interviews with forty-one subjects (occupants and firefighters) from fourteen house fires, ninety-six subjects from fires in eight multiple-occupancy buildings, and sixty-one subjects from six hospital fires. Rather than panic or irrational behavior, what they found was that occupants became involved in protective activities such as warning others, calling the fire department, and rescuing or assisting others. The authors made a distinction between panic and behavior that was dysfunctional because it took up valuable time or was potentially dangerous. They pointed out that what was later called dysfunctional behavior was usually not caused by irrationality but resulted from occupants' attempts to deal with uncertain information in a rapidly developing emergency. (28)

EXAMPLE: Hurricane Carla, Galveston, Texas, 1961. Carla was a category-5 hurricane, the highest level on the Saffir-Simpson scale. It was the worst hurricane to hit the Texas coast in 40 years, having sustained winds of over 150 miles per hour as it positioned itself to strike the mainland.²⁹ Headlines in several newspapers reported, "More than 100,000 persons flee in near panic." Actually, 70–80% of those on Galveston Island remained during Carla, even though most knew they would be cut off from the mainland. Islanders boasted of having had beach parties during the hurricane. After Carla, a Galveston professional man said that he was "very proud of not having evacuated." His

parents had never fled before a storm, and neither had he. For those that did leave, the evacuation was reported as calm, business-like, and without panic. (30, 31)

EXAMPLE: Fire, Beverly Hills Supper Club, Southgate, Kentucky, 1977. British newspapers carried the following headlines: "Panic Kills 300" (*The Sun*), "Panic and 300 Stampede to Death" (*Daily Mail*), "A Killer Called Panic" (*Daily Express*). (14) However, detailed investigations carried out by the National Fire Protection Association did not find widespread panic. In some of the interviews, persons referred to "panicky behavior," but it was unclear what they meant, since the specific behavior and actions of these supposedly panicked persons was not actually described. Likewise, although some screaming was heard, the reasons for the screaming (for example, screaming in attempts to locate others) were not reported.

However, when actual *behavior* was described, it was clearly not panic. Even though the Supper Club staff had not received fire emergency training, they did not abandon their posts and flee. Rather, their first actions were to investigate the source of the smoke, try to put out the fire with extinguishers, notify the fire department, assist patrons in exiting the building, and rescue patrons who had collapsed from the smoke. Even after helping patrons out of the building, staff reentered the burning building to help others. A survey of survivors taken after the fire indicated that 76% of the patrons were assisted out of the building by staff. Patrons were observed to evacuate in an orderly and calm fashion, even when thick, blinding, choking smoke enveloped them. There was very little shoving, and even when it did occur, it was described as "a constructive shove" to get persons to move faster. It was not a result of hysteria or an attempt to get out before others.

Staff and patrons alike urged others to be calm and not to panic, sometimes downplaying the danger. Almost all of the deaths occurred in the Cabaret Room, which was the last to be notified of the fire. Even after the fire was announced, comedians on stage in the Cabaret Room continued their performance, an action that could well have contributed to the fact that many of its occupants did not take the warnings seriously until it was too late. Unfortunately, the number of occupants in the room was three times larger than the existing exits could accommodate. Most of the occupants were overcome by smoke and collapsed before they could get out. Some persons who were successful in evacuating were only able to walk a few yards outside the building before they collapsed and died. There was no evidence to suggest that any of these deaths were due to trampling underfoot. It is ironic that in a situation where survival utterly depended on rapidity of evacuation, there sometimes seemed to be more concern about preventing panic than convincing people to leave. (32)

EXAMPLE: Air crash, Sioux City, Iowa, 1989. The rescuers and firefighters who were first on the scene were amazed at how calm the victims were. The Sioux City fire chief reported, "There was no chaos—no mass confusion. They were calm and organized, and many of the survivors, once they got out, stayed and assisted others. They, themselves, were instrumental in saving additional lives." (33)

EXAMPLES: Bombing, World Trade Center, New York City, 1993, and terrorist attack, 2001. Evacuations were carried out in an orderly fashion, without panic. (6, 34–36)

EXAMPLE: Earthquake and fire, San Francisco, 1906. Jack London rushed to San Francisco to cover the earthquake, the biggest story of his lifetime. He reported that, "remarkable as it may seem, Wednesday night, while the whole city crashed and roared into ruin, was a quiet night. There were no crowds. There was no shouting and yelling. There was no hysteria, no disorder...I saw not one woman who wept, not one man who was excited, not one person who was in the slightest degree panic-stricken...Never, in all San Francisco's history, were her people so kind and courteous as on this night of terror." (37)

EXAMPLE: Earthquake, Los Angeles, 1971. The first floor of the two-story Mental Health Building of the Los Angeles County Olive View/UCLA Medical Center completely collapsed. The upper story—containing fifty-five psychiatric patients—ended up at ground level. A staff member described a frightening noise and being thrown violently across the room by the shaking. Patients were observed to be cooperative, and there was no panic. In fact, some of the more psychotic patients became more rational during the emergency and rescued fellow patients, then after some time passed, they relapsed back into their baseline psychosis. (38)

Concerns have been expressed as to whether the lack of panic would apply to a bioterrorism incident. (39) Would such an event lead to widespread panic, fleeing from the cities, and refusal of medical practitioners to take care of victims? Some remember the hesitancy of physicians to treat AIDS patients and wonder if the same thing would happen again. Although there is little data on which to base an opinion, two events are instructive: the sarin attack in Tokyo in 1995 and the flu pandemic of 1918.

Murakami (40) interviewed forty victims of the 1995 sarin gas attack in Tokyo. It is of interest to note that some interviewed victims used the term panic to describe what happened. Yet, their observations of the way people *actually behaved* were not consistent with the definition of panic. An example is the following account by a woman victim.

I felt absolutely awful. My eyes were twitching, like muscular convulsions, though they didn't hurt, but everything was yellow...when I got off [the subway] I thought, this has to be sarin. My pupils are contracted, aren't they? As part of my job, I read the newspaper thoroughly every day and watch the news without fail. I knew about the Matsumoto incident, which is when I first encountered the term "pupil contractions." Oddly enough, I was extremely calm. I knew it was sarin. (40)

Despite her realization that she had been exposed to deadly nerve gas, she assisted two other victims to the subway station office to summon an ambulance. When one could not be obtained, the three walked to a nearby hospital, escorted by a subway station attendant.

Another victim described his experience as follows.

There came an announcement that a passenger had collapsed on the subway and that the subway would be making a temporary first-aid stop at the station. This was followed by the announcement that three passengers had collapsed. After the train stopped, a man walked by on the platform stating that there was sarin gas. Following that, several nearby people stood up, though they did not seem to be in any particular hurry. They weren't running to escape or anything. A short time later, another announcement stated that poison gas had been detected and that passengers should head for safety above ground. At that time, all the passengers stood up and got off the train, but still there wasn't any panic. They walked a little faster than normal, but there was no pushing or anything. I went out the exit and up the stairs. Outside, I wanted to have a cigarette, but I could barely draw air into my throat before I was coughing hard. That's when I knew I'd breathed the gas. Because I could walk, unlike those that were being carried out of the station, I didn't think my condition was that serious. So I walked to the Shintomicho Station and took the Yurakucho Line to work. When I got there, the executive director asked me if I was all right, and he told me that they were saying it was sarin, so I'd better go to the hospital quickly and have some tests. (40)

In his study of the 1918 flu pandemic, Crosby (41) made a conservative estimate that more than half a million Americans died as a result. This figure is greater than the combined deaths from World War I, World War II, the Korean War, and the Vietnam War. Yet, the masses did not flee the cities in blind panic. In fact, officials wanting to prohibit public gatherings or enforce the use of surgical masks in an effort to prevent spread of the disease were met with public resistance. Physicians and nurses continued to care for flu victims even though their colleagues were falling victim to the disease. Visiting nurses often faced scenes

reminiscent of the Bubonic Plague in the fourteenth century. Fifteen-hundred nurses volunteered their services to fight the influenza battle even before the American Red Cross appropriated money to pay them. Ad hoc emergency hospitals, soup kitchens, and ambulance services sprouted up to meet the demand. Nonmedical volunteers brought food to tenement houses to feed persons too ill to care for themselves. They manned cars to transport doctors and nurses on house calls to treat persons who were ill. Even taxi cabs were recruited, and despite the illness of the passengers, the drivers never once refused to transport them to hospitals. Even those with no professional obligation to care for the sick volunteered in droves, knowing full well that they were exposing themselves to a lethal, contagious, untreatable disease in the process. (41–44)

Hesitancy to Evacuate

In contrast to panic, a more common problem is getting people to evacuate and keeping them from returning before the danger is over. (2, 6, 11, 23, 30, 45–48)

EXAMPLE: Hurricane Andrew, South Dade County, Florida, 1992. While it is estimated that seven million residents evacuated, three million refused to leave. (49)

EXAMPLE: Volcano eruption, Mt. St. Helens, Washington, 1980. When Mt. St. Helens began showing signs of an impending eruption, actions were taken to keep people away from the threatened area. Violators were subject to fines of \$500 and 6 months in jail. Nevertheless, it was fairly easy for anyone to circumvent the roadblocks by using numerous logging roads all around the mountain. Numerous people did just that, much to the frustration of law enforcement officers trying to keep the area closed. (45)

Usually, the initial response to warnings of a disaster threat is disbelief, not panic. (23) If it appears that the warning is credible, the next response is to try to confirm its validity, usually by listening to radio and television broadcasts or by talking to friends, relatives, or neighbors. (13, 23, 48, 50) If there is conflicting information or vagueness about the threat, recipients of the warnings will tend to downplay the danger. Members of threatened populations will seize upon any "vagueness" in a warning message that allows them to reinterpret the situation in a nonthreatening fashion. (13, 23) Nonspecific warning methods, such as sirens, are notoriously ineffective in getting recipients to take protective action. (13)

EXAMPLE: In their study of a nursing home fire, Edelman et al (51) observed that because of prior false fire alarms, a number of the residents ignored the

initial warnings and did not take them seriously until they heard other occupants screaming, "Fire!" Panic *behavior* was not observed, although one mentally retarded patient stated that she had "panicked." It was unclear what this patient actually meant when she reported this.

Occasionally, in technological emergencies involving potential threats that are unfamiliar or "invisible" to the public (for example, chemical or radiological accidents), people will interpret inconsistent or vague warnings as if the worst were likely to happen. In such cases, they are more likely to heed evacuation orders or to evacuate on their own initiative. (52)

The problem with the panic misconception is that the public, the media, and even emergency planners and public officials *believe it*. (3, 39) Because of this, officials may hesitate to issue warnings because they are convinced that the resulting panic will cause more damage than the disaster itself. (2, 14, 53, and 54) This belief has led to recommendations to avoid panic by (1) providing minimal information to occupants in the event of a building fire and (2) carrying on normal activities until the last possible moment. In places of entertainment, it has been suggested that the band should continue to play if there is a fire and that panic can be avoided by having telephones located in areas where people cannot overhear calls to the fire department. (14)

A more relevant concern for these public officials should be how to create warning messages that the public will heed. Several factors serve to improve the response to warnings. (2) The public is more likely to act on warning messages if they understand the warnings, if they believe that the warnings are true, and if they believe they are *personally* at risk. (50) They are more likely to heed warnings if past warnings were accurate and did not "cry wolf." (2, 48, 51) Warning messages are also more likely to be believed if they are issued by a credible source, such as police or fire officials, emergency management or disaster officials, or elected officials, such as the mayor or governor. (13, 51)

The specificity of the warning influences its effectiveness. Recipients need to know more than just the fact that there is a threat. Effective warnings are those that state, *in terms clear to the recipient*, the urgency of the situation, likelihood of impact, and exact localities at risk. For example, saying that the river will crest five feet above flood stage may convey less meaning than either saying it will cover the courthouse stairs or showing a map of the exact streets that will be flooded. (21, 48) Even in parts of the country where tornadoes are common, terms like "tornado watch" and "tornado warning" are misunderstood by more than a third of the public. (2) Disaster warnings are not usually very effective unless they identify specific courses of protective action that can be taken to

reduce the threat. Protective actions may be obvious to some persons who have lived for some time in disaster-prone areas. However, to many persons, especially in the case of technological accidents, the appropriate protective actions may be less apparent. (2)

The context of the warning is also important. (2) Warnings issued by television and radio stations may not be taken seriously unless normal programming is suspended to cover news about the threat. Weather cues are another important contextual variable, as well as seeing flames or smoke in a building. (51, 55) (See the following examples.)

EXAMPLE: Tornado, Grand Island, Nebraska, 1980. Sirens were heard frequently from April through late summer, but their warning value may have been somewhat tempered by a sense of relative invulnerability. (The last time a tornado had hit Grand Island was in 1857, and year after year since that time, those storms that had appeared always veered north of the city.) Sirens did not usually trigger a sense of immediate danger. They were heard during Civil Defense tests, conducted twice each month, and they were heard when funnel clouds had been sighted nearby, funnel clouds that ended up not actually posing a threat to the city. The townspeople seemed to rely primarily on their own weather sense and ability to read environmental clues. The sound of sirens was interpreted not so much as a warning of clear and present danger as it was a signal to watch the skies. Thus, unless conditions looked particularly threatening, the sirens did not generate much alarm. However, on the evening of June 3, they were not heard with the usual complacency. The skies did, on this occasion, look uniquely ominous. Many people turned on the radio, began making personal weather observations, and in general became sensitized to signs of potential danger even before the sirens began to sound. When the sirens began to go off, they were heeded. The result was that, in spite of bearing the full and extended force of 6 twisters that flattened one-fifth of the town (population 40,000), there were only 5 deaths and a relatively small number of injuries. The experience of most persons interviewed after the storm can be summed up in the words "We hear the sirens all the time, but for some reason, [this time] we paid attention." (55)

EXAMPLE: Flash flood, Big Thompson Canyon, Colorado, 1976. A storm dumped more than twelve inches of rain on the western watershed of the canyon. Although the lower end of the canyon was at greatest risk, it was not even raining at this location. Thus, it was hard to believe that a flood was possible, and warnings were treated with disbelief. When the ensuing flash flood raged through the canyon, it swept 146 persons to their deaths. (56)

Several other factors can enhance compliance with warnings, such as repeated warnings and similar warnings from multiple sources, provisions for assuring the

safety of livestock and pets, the ability to account for the safety of family members, and assurances that there will be no looting. (2, 6, 52, 57, 58) Finally, invitations from friends or relatives to shelter with them are likely to increase the rates of evacuation. (2, 13, 23)

Disaster planners and response agencies need to be aware that rapid evacuation may spell the difference between death and survival. Evacuation warnings should not be withheld or delayed for fear of precipitating widespread panic. While the conventional wisdom has been that one should not “shout fire in a crowded theater,” the evidence from the study of fires suggests that such an emphatic warning may save lives if it convinces the patrons to exit in an expedient manner.

The “Disaster Syndrome” Misconception

Another common misconception is that many persons faced with disaster are so overwhelmed that they develop what has been called “disaster shock” or the “disaster syndrome.” This is said to be a state of stunned psychological incapacitation that results in the inability to take care of oneself or others. Those suffering from this supposed state are thought to be unusually dependent on and susceptible to strong leadership from authorities. (3, 59, 60) Actually, only a small proportion of disaster victims suffer from this kind of psychological shock, which tends to be limited to sudden, violent disasters. Even when it occurs, the condition is usually short lived. (5, 18, 21)

Search and Rescue by Survivors

In contrast to this image of dependency, most disaster victims take the initiative to help themselves and others. In numerous disasters, going back for decades, it has been observed that a large part, if not most, of the initial sheltering, feeding, relief, rescue, and transport of victims to hospitals was carried out by survivors in and near the stricken area. (1, 6, 18, 25, 61–67) Search and rescue is an important case in point. Most post-disaster search and rescue is carried out not by trained emergency response organizations but by family members, friends, neighbors, coworkers, and even complete strangers who happen to be at or near the scene at the time of impact. (2, 25, 62, 66–72)

EXAMPLE: Tornado, Wichita Falls, Texas, 1979. More than 5,000 victims needed immediate help. Only 13% of the victims rescued indicated that they had been rescued by someone they recognized—usually by uniform—as being

associated with an emergency organization. The others were assisted by average citizens, many of whom were themselves victims. Fifty-nine percent of all uninjured victims interviewed rendered aid to someone else within minutes after the tornado passed. It is estimated that this amounted to upwards of 10,000 individuals. (66)

EXAMPLE: Earthquake, San Francisco Bay Area, 1989. Random surveys carried out in two of the six impacted counties (San Francisco and Santa Cruz) indicated that more than 31,000 residents became involved in search-and-rescue activities in the immediate aftermath of the disaster. (73) Across the bay, in Oakland, the earthquake had collapsed a double-decker section of interstate highway, called the Cypress Expressway, where the highest number of quake related fatalities occurred. The Oakland Fire Department reported, "The success of the Cypress rescue operation was due, in large measure, to the efforts of hundreds of citizen volunteers. These volunteers, coming from residences and businesses in the neighborhood or passing by on the street and freeway, performed some of the first rescues of trapped motorists. Using makeshift ladders, ropes, and even the trees planted beside the freeway, these volunteers scrambled up onto the broken structure to render first aid and help the injured and dazed to safety." (74)

EXAMPLE: Earthquake, Tangshan, China. 1976. This earthquake, probably the worst peacetime disaster of the century, resulted in approximately 250,000 deaths. Yong reported that 200,000 to 300,000 victims rescued themselves and then carried out 80% of the rescue of others. (75)

EXAMPLE: Earthquake, Mexico City, 1985. More than 2.8 million adults volunteered in the response, with more than 1.2 million of them becoming involved in search-and-rescue activities. (76)

EXAMPLES: Four disasters occurring in 1978–1979. The following percentages of search and rescue were carried out by bystanders: tornado, Lake Pomona, Kansas—50%; tornado, Cheyenne, Wyoming—29%; tornado, Wichita Falls, Texas—40%; and flash floods in Texas—67%. (66)

EXAMPLE: Earthquake, Coalinga, California, 1983. "Local untrained citizens did most of the initial search-and-rescue work, including control of utilities on a block-by-block basis...Without this responsiveness a much larger disaster would have resulted..." (77)

EXAMPLE: Gas explosion, Guadalajara, Mexico, 1992. Researchers interviewed 43 victims who had been buried alive in the impact and found out that all the victims had been rescued within two hours by relatives, neighbors, and others who lived in the immediate area. Professional search-and-rescue teams

arrived too late to have much impact on victim survival; the vast majority of the victims they located were already dead. (6)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, Oklahoma, 1995. Hundreds of persons who worked in the downtown area rushed to the site, and many entered the building to search for survivors. In the first one and a half hours of the incident, countless civilians and rescue personnel—many without apparent direction by the authorities—were in and around the building, all desperately wanting to help. (16)

One of the consequences of search and rescue by survivors is that the activity is usually not well-coordinated. (1, 13, 78, 79) Rosow, in his assessment of four tornado disasters, likened disaster search and rescue to a “mass assault.” (80) He described large numbers of people tackling the first obvious problem coming into view, overcoming it by sheer force of numbers, and then moving on to take on the next obvious problem in the same manner. During this process, little attention was being given to the overall picture.

Even when trained emergency response teams become involved, a coordinated effort is not assured. At least in part, this may be due to the fact that it is often unclear who has overall legal responsibility for coordinating widespread post-disaster search and rescue, especially when multiple agencies respond or disasters cross jurisdictional boundaries. (2)

EXAMPLE: Tornado, Flint-Beecher, Michigan, 1953. We had our own group—auxiliaries [firemen]...and some guys from the rescue team. And we would be working our way down this block from one house to the next. But there was some other gang ahead of us and another following right behind, maybe thirty feet away, looking through the place that we just finished. We would shove around a pile of timbers and junk to search through underneath, and when we'd finish, the team coming afterwards would push it back to check underneath where we had dumped it. Q: Was it the same pile of junk that the team ahead of you shoved around? A: Yeah, I guess we were doing the same thing ourselves—following the gang ahead of us. (80)

Local officials should include provisions in their disaster plans to coordinate search and rescue by survivors. A first step is to identify someone to lead the effort. Even relatively simple measures can have a significant impact. For example, when a tornado struck Waco, Texas, in 1953, initial search-and-rescue activity was not well-coordinated. However, by the second night, groups of about fifteen civilians were organized under a leader and an assistant leader from military units that had responded. Each of these teams was linked to a command post

by walkie-talkie. (81) This type of arrangement could easily be adapted in the early stages of civilian disaster responses to lend order to search-and-rescue efforts.

Casualty-Transport by Survivors

It is often through these widespread post-disaster search-and-rescue activities that disaster victims first make contact with assistance. However, to the untrained lay public, the "best emergency care" is seen as transport as quickly as possible to the closest hospital. If sufficient ambulances are not immediately available, survivors do not tend to sit idly by awaiting their arrival. Rather, they use whatever means of transport is expedient. In a study of 29 U.S. disasters, it was found that at 75 hospitals where data was available, 54% of the initial casualties arrived by ambulance, 16% by private vehicle, 16% by police car, 5% by helicopter, 5% by bus or taxi, 4% on foot, and 10% by unknown means. While these figures refer to the first patients to arrive, overall, most patients in these disasters were transported by nonambulance vehicles. (1) In numerous disasters since this study, the findings have been similar. (2, 68, 82)

EXAMPLE: Earthquake, San Francisco Bay Area, 1989. On the night of the earthquake, only 23% of casualties arriving at hospitals came by ambulance. (83)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, 1995. Only 36% of the victims transported to hospitals came by ambulance. (84) More than 300 patients were transported by other means, such as bus, van, or private vehicle. (85)

EXAMPLE: Riots, Los Angeles, 1992. Only 34% of the patients were transported to the hospital by ambulance. Police cars transported 11%, and 13% arrived by foot. Depending on the source of data, estimates are that between 30% and 70% of the persons injured transported themselves to the hospital or were taken by friends. (86)

EXAMPLE: Subway nerve gas attack, Tokyo, Japan, 1995. At one of the closest hospitals, St. Luke's International, 7% of the victims arrived by ambulance, 12.9% by fire department nonambulance vehicle, 1.4% by police car, 24.1% by taxi, and 34.9% on foot. (87)

EXAMPLE: Terrorist attack, World Trade Center, New York City, 2001. Only 6.8% of the victims transported to hospitals arrived by ambulance. The vast majority of patients did not use out-of-hospital emergency medical ser-

vices to get to the hospital. Instead, many patients self-referred themselves by foot, public transportation, or private conveyance to the EDs in New York, NY, and surrounding areas. (88)

Nonambulance patient transport in disasters has several important ramifications. It helps to explain why most patients arriving at hospitals have not been triaged in the field or have not received first-aid treatment. (1) These patterns may also explain why hospitals may first be notified of the disaster by the first arriving casualties (or the media) rather than by authorities on site and why meaningful information from the scene about numbers and types of casualties is often not received. (1, 74, 89–102) Because so much of the initial care of disaster casualties is provided by the survivors themselves, it would seem that providing the public with first-aid and disaster skills (as part of a high school curriculum, for example) should be a part of any community disaster-preparedness program. Another approach is to provide educational materials about disaster response to the public in print form. In California, for example, information for the public about how to prepare and respond to earthquakes is published in the front section of telephone directories.

Overloading of Closest Hospitals

Because most initial casualty transport is carried out by the survivors, most disaster casualties end up at the closest hospital,² while other hospitals in the area wait for patients who never arrive. (2, 82) In his study of 29 disasters, Quarantelli found that in 75% of the cases, more than half of the victims were taken to the closest hospital, and in 46% of the cases, more than three-fourths of the victims went to the closest hospital. Apparently, this was not because other hospitals were full, since the average hospital bed vacancy rate in these disasters was 20%. (1) See Figures 27.1 (p. 365) and 27.2 (p. 366) for data from the Kansas City skywalk collapse and the bombing of the Murrah Federal Building in Oklahoma City. It is apparent that a few of the closest hospitals received most of the casualties and that numerous local hospitals were not utilized at all.

This pattern of overloading of hospitals closest to the disaster site has occurred even when sophisticated plans had been made to equitably distribute patients among the available hospitals in the event of a disaster. (1) Such plans, no doubt, were based on the assumption that most casualties would be transported by local

2. A variant on this theme is when one hospital is locally renowned for giving emergency care, in which case most casualties end up there.

ambulances under hospital direction. Thus, when communities base their plans on the belief that local emergency organizations will carry out most disaster-response activities, they are caught completely off guard when the public takes matters into its own hands. Actually, it is not just the public that does this; police and firefighters have also been known to load victims into nonambulance vehicles and send them to the closest hospitals. (1)

While overloading of the closest hospitals may be very difficult to prevent, there are some things that can be done to reduce it. When it is possible, those who are transporting casualties should be advised as to which hospitals are receiving fewer patients and thus have shorter waiting times. It is helpful to have a centralized community-wide system for rapidly determining which hospitals are being overloaded and which have not exceeded their capacity for patient care. However, communities that depend on the use of cellular or telephone communications for this purpose often find that these circuits rapidly become overloaded and unusable (discussed further in the next section). Two-way radio networks using common frequencies are far more reliable. Although in many disasters only a minority of casualties are transported by ambulance, ambulances that are transporting casualties might be wise to avoid the closest or most locally renowned hospitals, which are likely to be the busiest. Redistributing casualties after they have reached the hospital is constrained by federal laws governing patient transfers. Although hospitals are exempt from these laws in the event of a national emergency, it is not clear if this also will apply to local disasters. (103) It might, however, be possible to stop vehicles transporting patients *on major routes to area hospitals* and redirect them to facilities most able to handle the patients.

Massive Inquiries about the Missing

In contrast to the dependency image, members of the public will take actions to reunite with family members and loved ones. If they cannot reunite, they will take measures to find out if family and loved ones are okay. The magnitude of this effort can have profound and often unexpected effects on emergency response organizations. Because residents in the United States are very mobile, family members and loved ones are often separated from one another. Nearly every family has blood relatives living in other parts of the nation or even overseas. Even family members who do live together are often separated throughout the day.

Furthermore, with modern mass-media communications, even relatively small disasters can become international events, literally within minutes. These initial

reports can be exaggerated and dramatic. However, they often lack specific details—about the scope of the disaster and the exact locations involved—that would allow persons in their audience to determine whether their loved ones have actually been affected. The immediate impulse of many is to pick up the phone. If the person is not at home, calls will be made to hospitals, law-enforcement agencies, American Red Cross chapters, government offices, and other sources of information in the impacted area. These calls will come from all over the nation and even from foreign countries. (63)

When disaster warnings have been issued, the public will also make calls trying to confirm the existence, locality, and severity of the threat. They will call to seek advice about what to do, and they will call to offer donations and volunteer services. The volume of this telephone traffic helps to explain why so often in disasters telephone (and more recently cellular) circuits rapidly become overloaded and unusable. This is a finding that is consistent in disaster reports going back nearly fifty years. (2, 6, 63, 66, 80, 81, 89, 104–116) Yet, it continues to be neglected in community disaster planning efforts. In one study, it was observed that this jamming occurred when as few as 10% of the telephones was being used simultaneously. (23)

EXAMPLE: Hurricane Andrew, Homestead, Florida, 1992. The cellular circuits that were not damaged became overloaded by civilian use from approximately dawn to 9:00 P.M. (117)

EXAMPLE: Air crash, Sioux City Iowa, 1989. Because families on the airliner had been split up and taken to different hospitals, and because inquiries from relatives, friends, the airline, and the media were flooding hospital telephone lines, it was necessary for the two medical centers involved to communicate closely about the crash victims and their conditions. When it became apparent that telephone communications would continue to be difficult, the hospitals had to rely on a police car to ferry casualty lists between the two facilities. (118)

EXAMPLE: Earthquake, San Francisco Bay Area, 1989. Communication systems were seriously overloaded during the first critical hours after the quake. “This is to be expected, as a fearful public wants information from authorities and wants reassurance that other family members and friends are okay. One result was that a high number of calls received by fire dispatch operators were not to report actual emergencies, but were calls seeking information....” (106)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, 1995. During the first twelve to eighteen hours, cellular and telephone circuits were overloaded. This made it extremely difficult to communicate. Portable/mobile

cellular sites were eventually erected near the incident site to ease the stress on cellular circuits. (119)

EXAMPLE: Terrorist attack, World Trade Center, New York City, 2001. "It happened throughout the United States on September 11, 2001, but nowhere like lower Manhattan. A busy signal, 'Please try your call again later,' or complete lack of dial tone met the ears of landline callers and cell phone users. And nowhere was it more crucial that a dial tone exist than in lower Manhattan, as people tried to locate family members, hospitals tried to contact reserve staff, and emergency management and public health agencies tried to coordinate a response to the day's tragedy." (120) Verizon reported that its usual call volume of 115 million calls per day in the New York City metropolitan area doubled, making cell phones useless. Long-distance carriers that depended on Verizon's landlines in the area were also crippled. (121)

When those seeking information about loved ones are unable to get through by phone, those living within driving distance will show up in person to continue their quest. (62, 63, 81, 120, 122) Few public safety agencies, hospitals, emergency response organizations, or governmental bodies are prepared for the deluge of inquiries after a disaster, and the results can be literally paralyzing. (2)

Despite the predictability of this search for the missing, it does not appear that most communities have established formal procedures and plans for tracking the missing and making this information available to the public. Planning should include agreement on who will be responsible for community-wide victim tracking. Emergency planners should identify institutions where information on the missing is likely to be available (such as hospitals, morgues, shelters, and jails) and they should familiarize their staff with the plans. Victim information should be transmitted by encrypted communications to a central location, where it can be collated and made available to the public. To protect privacy, information should only be released to those giving specific names of the missing they are seeking. Because telephones and cellular communication circuits are likely to be damaged or overloaded, transmission should be by satellite phone, Internet, or two-way radio nets. Preferably, this information would be made available to the public through a toll-free phone number and/or Internet site distant from the disaster site. This way, inquiries will not place an extra burden on local communications circuits.

The Command-and-Control Model

The unfounded belief that people in disasters will panic or become unusually dependent on authorities for help may be one reason why disaster planners and

emergency authorities often rely on a “command-and-control” model as the basis of their response. This model presumes that strong, central, paramilitary-like leadership can overcome the problems posed by a dysfunctional public suffering from the effects of a disaster. This type of leadership is also seen as necessary because of the belief that most counter-disaster activity will have to be carried out by authorities. Authorities may develop elaborate plans outlining how they will direct disaster response, only to find that members of the public, unaware of these plans, have taken actions on their own. (123)

Disaster researchers recommend that disaster plans be based on what people naturally tend to do in disasters rather than the command-and-control model. This is more effective than designing a plan and expecting people to conform to it. (21, 23, 124) Planners need to know that in disasters the public will spontaneously take rational measures to protect themselves and to help others. Most initial disaster relief is provided not by formal emergency and relief organizations, but by residents of the impact area and surrounding communities. It is not likely that local authorities will be able to curtail or control these efforts. However, effective planning can take these efforts into account and influence them. For example, authorities may have little control over which hospitals receive victims transported by private vehicles. Ambulances transporting victims, however, can be directed to bypass the closest hospital and go to hospitals that are not otherwise receiving many victims. Authorities also can reduce the extent of jammed cellular and telephone circuits by setting up victim-tracking procedures and providing the information to the public via hot lines set up outside the impacted area. Similarly, hotlines can be established outside the area for those wishing to volunteer their services or donate materials.

Volunteers

Belief in the “disaster syndrome” also catches local authorities off guard because they do not expect, nor have they made provisions to deal with, the flood of volunteered assistance that is offered in disasters. The United States has a long history of volunteerism. This tradition is exemplified by the number of volunteer ambulance services and fire departments that exist in this country and numerous social, religious, and philanthropic organizations that volunteer their time. This altruism does not vanish in disasters; if anything, it becomes stronger.(2, 13, 25) In fact, within the stricken area, more potential volunteers become available when schools and nonessential businesses close down.(18, 25) In contrast to volunteer organizations that participate in the routine response to emergencies,

many disaster volunteers are unsolicited and unexpected. (2, 13, 125) As discussed previously, most search-and-rescue operations, as well as casualty transport, is carried out by untrained bystander volunteers.

Disaster-stricken communities are often deluged with offers of volunteered assistance from trained individuals and outside emergency response organizations. Others respond to requests by the media or other unofficial sources to "send everything you've got." In addition, local officials may issue public appeals for assistance without any appreciation for how successful their requests will be. Once initiated, these appeals are very difficult to rescind. (2)

EXAMPLE: Air Crash, Kenner, Louisiana, 1982. The Kenner Fire Department requested assistance from three outside fire departments. However, seven responded. Fourteen helicopters were available, many of which landed in a large field next to city hall. Ambulances and rescue units responded from up to seventy miles away. Forty-two doctors and a hundred nurses, more than planned or expected, arrived on the scene. Local command staff were unaware they were even coming and therefore could not cancel their response. It was estimated that about 200 full-time and reserve police showed up. Many drove as close to the scene as possible, locked their cars, and proceeded on foot. Unfortunately, their police cars subsequently impeded access for fire trucks and ambulances. All of this massive response was for only four injured survivors. (126)

EXAMPLE: Earthquake, Coalinga, California, 1982. The quake generated only 16 serious casualties, yet 5 medevac helicopters showed up, and 30 ambulances came from as far away as the San Francisco Bay Area, a distance of 100 miles. None had received an official request from local authorities, and some left their home areas uncovered to participate in the response. Local authorities were not aware of their presence, much less able to integrate them into the response. (77, 127)

EXAMPLE: Terrorist Attack, World Trade Center, New York City, 2001. "A large number of ambulances that are not a part of the 911 system volunteered and/or self-dispatched to the site, (i.e., without coordination and direction of EMS Command or Dispatch), which degraded FDNY's ability to maintain control." (128) When the Health care Association of New York State established a hotline for medical volunteers, they received more than 40,000 calls the first day. By 5 P.M. the next day, callers heard the message, "We have received an overwhelming response to our call for assistance. Thank you for your concern. We are unable to accept any more calls." The Red Cross reported it had more volunteer offers (22,000 in 2½ weeks) than in any prior disaster. (129, 130)

Planners should anticipate that in any disaster, they will have to deal with large numbers of volunteers, even if they are not requested. It is unlikely that this can be prevented. However, it can be influenced. One mistake to avoid is to request volunteers without first checking to see that they are actually needed. If volunteers are *not* needed, this information should be quickly conveyed to the public via elected officials, agency spokespersons, and the news media. If it is felt necessary to make public appeals for volunteers, such requests should state specifically what skills are needed. Furthermore, these volunteers should be directed to report to a specific check-in area located away from the site and brought into the disaster-impacted area only when they are needed.

Donations

Often, disaster planners and officials are also unprepared for the magnitude of donations that are triggered by disasters. (63, 71, 131) These donations include food, clothing, blood, pharmaceuticals, medical supplies, and a host of other materials, equipment, and supplies. (81)

EXAMPLE: Tornado, Waco, Texas, 1953. One of the biggest problems was the food situation. It started rolling in from all over the state. One of the major tasks was the disposal of thousands of donated sandwiches before they became dangerous. Proffered supplies were not confined to food items. Everything imaginable was offered in unlimited quantities. We were so disorganized we didn't realize what we actually needed. On the other hand, we had so much that we couldn't take care of what we had. Food and clothing donations came in such quantities that they threatened to crowd the workers out of the Red Cross headquarters and Salvation Army building. A total of three and a half box cars of clothing arrived from all over the nation. After the disaster, some three tons of clothing remained on hand. (81)

EXAMPLE: Earthquake, San Francisco Bay Area, 1989. Throughout the first night, volunteers poured into the area, arriving with supplies and equipment which they thought might be needed. Contractors and construction workers volunteered their services and equipment. A roofing-supply yard provided an elevated conveyer belt, which was used to carry rescuers and equipment up onto the collapsed Cypress Expressway, where victims were trapped. A request was made for portable lighting equipment, and soon contractors began arriving with generators, electrical cords, and lighting units. No one asked for a voucher or receipt. (74)

In addition to material goods and money offered by the general public, corporations and businesses also generously donate items. Examples include cellular

telephones (16, 117, 120, 132, 133), computers (16), free long-distance phone calls (16, 115), fast food (16, 105, 113), electrical generators, cords, portable lighting (74), construction equipment (such as cranes, trucks, lo-boys, clam buckets, and bulldozers) and supplies (16, 74, 80), fork lifts (74), air tools and hoses (74), airbags for lifting debris off victims (74), wood blocks for cribbing (74), wheel barrows (16), pharmaceuticals (16), sunscreen (16), groceries (134), gasoline (134), clothing (134), rain gear (16), blankets (16), booties for search dogs (16), chiropractic services (16), laundry and dry cleaning services (16), and mental health services (16).

A large portion of donations in many disasters is inappropriate to the needs of the incident and not based on any systematic needs assessment. Examples include outdated drugs, antibiotics for diseases not commonly found in the area impacted by the disaster, and inappropriate clothing items. (63, 71, 135, 136)

Blood Donations

The generosity that tends to follow disasters applies to blood donations as well. However, problems can occur when elected leaders, government officials, or the media assume that blood is needed without first assessing the actual need. This can cause problems at hospitals and blood banks. (25, 63, 137–139)

EXAMPLE: Tornado, Athens, Georgia, 1973. Whereas the hospital had always anticipated problems caused by curiosity seekers and families of victims, one of the greatest problems was caused by blood donors. A request for blood donors produced a response far in excess of that which could be handled by the hospitals. These people left their vehicles parked illegally and blocked traffic around the hospital. (125)

EXAMPLE: Air crash, Sioux City, Iowa, 1989. Blood supplies at the local hospitals and at the Siouxland Community Blood Bank were adequate to meet all the demands. Even though officials made no public appeal for donors, over 400 persons turned out to give blood. Additional offers of blood from blood centers in Des Moines, Omaha, and other areas much farther away were declined. (132)

EXAMPLE: Air crash, Dallas-Ft. Worth International Airport, 1985. Before adequate information was even available about the crash, local radio stations suggested that blood would be needed. Four hundred ninety-one persons responded to this appeal, inundating the blood bank at Parkland Memorial Hospital and causing a crowd-control problem. Personnel had to be diverted from the emergency department to the blood bank to deal with the donors.

Donors were actually turned away because of the hospital's inability to process the blood. (107)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, 1995. Community, state, and national support began within minutes of the bombing. The Oklahoma Blood Institute opened its satellite centers, where citizens stood in line for two and a half to three hours to donate. The centers closed in the late afternoon because the Institute had received all the blood it could process. (16)

EXAMPLE: Explosion, 3M Plant, St. Paul Minnesota, 1951. After a broadcast appeal for blood, the Red Cross blood bank was swamped with donors. Over 150 donors were processed, but 400 more were turned away. (140)

EXAMPLE: Skywalk collapse, Hyatt Hotel, Kansas City, Missouri, 1981. Within minutes, the blood bank was inundated with volunteers, and the blood bank ended up drawing blood all weekend. Over 2,116 units were collected. Of these, 249 units of blood, 67 units of platelets, 32 units of plasma, and 32 units of cryoprecipitate were used for the disaster victims. They not only met the demand from the accident but kept the blood bank from having to deplete its supply for routine cases. (141, 142)

EXAMPLE: Terrorist attack, World Trade Center, New York City, 2001. Television networks ran ticker tapes to inform the public of the need for blood. These tapes continued to run after sufficient donations had been collected, and the blood centers quickly became overwhelmed. (120)

Usually, the needs of a disaster are very specific, and donations not directed at those particular needs only serve to create more work for an already beleaguered community, which must now sort, label, and even dispose of large amounts of goods. Specifying a single site to receive and manage donations can help to reduce some of the disruption they cause. Again, as in the case of volunteers, problems can be avoided by proactively making it clear to the public when donations (for example, blood) are *not* needed. Cash is always the best donation, because it enables the recipient community to meet the specific needs generated by the disaster.

The Looting Misconception

Another common belief is that disasters are usually accompanied by increases in antisocial activity, such as looting, price gouging, traffic violations, and violence. Even when looting is not actually observed, that fact is often attributed to the extraordinary security measures that have been taken rather than the fact that

such behavior is inherently uncommon. Sometimes what is thought to be looting may actually be the salvage of disaster victims' property by friends or relatives unknown to those observing this activity. (63) Except in civil disorders and riots, increased criminal activity is uncommon in U.S. disasters. (5) Generally, the amount of donated goods far exceeds that which could be looted in disasters. When looting does occur, it is usually carried out by outsiders rather than members of the impacted community. (116)

EXAMPLE: Hurricane Betsy, New Orleans, 1965. When compared to the same month of the previous year, major crimes in the city dropped 26%, burglaries decreased from 617 to 425, thefts of greater than \$50 decreased from 303 to 264, and thefts of less than \$50 diminished from 515 to 366. (18)

EXAMPLE: Tornado, Waco, Texas, 1953. Police reported little in the way of looting, despite the fact that objects from jewelry store windows were scattered over the sidewalk. (81)

EXAMPLE: Earthquake, San Francisco Bay Area, 1989. Only a few dozen occurrences of looting occurred throughout the entire Bay Area. Most occurred in traditionally high-crime areas. Overall, many jurisdictions reported a decrease in criminal activity. (143)

EXAMPLE: Bombing, Murrah Federal Building, Oklahoma City, 1995. Overall criminal activity decreased. No looting was reported despite the fact that the blast destroyed shop windows and doors, leaving them open to passersby. People evacuated nearby banks so rapidly that they left money on the counters, but not a penny was taken. (16)

EXAMPLE: Hurricane Gilbert, Brownsville, Corpus Christi, Galveston, and Houston, Texas, 1988. Burglary rates in all these cities declined to below-normal rates, and there were no verified cases of looting. (5)

EXAMPLE: Terrorist attack, World Trade Center, New York City, 2001. Crime rates throughout the city fell sharply after September 11. (144)

At the same time, the fear of widespread looting has its consequences. For example, one reason people refuse to evacuate in disasters is to protect their property. (5, 23, 48, 58) It is also ironic that security measures undertaken to "prevent looting" can prevent residents from salvaging property that is exposed to the elements by the disaster. (80) Finally, overzealous police and security guards manning roadblocks set up to keep looters out sometimes prevent the entry of legitimate disaster-response personnel.

EXAMPLE: Flooding during Tropical Storm Agnes, Wilkes-Barre, Pennsylvania, 1972. There were many problems during the cleanup period, which lasted several weeks. Guards manning roadblocks would not honor identification cards of hospital employees. In order to obtain needed supplies and equipment, the hospital cleanup supervisors put on lab coats so they could pass as doctors and get through the road blocks. (145)

EXAMPLE: Hurricane Elena, Pinellas County, Florida, 1985. Altogether, 3 hospitals and 19 nursing homes had to evacuate a total of 2,071 patients. Volunteers and off-duty nursing home staff who were called back to assist with the evacuation were not permitted to pass through police checkpoints. (146)

EXAMPLE: Tornado, Barrie, Ontario, Canada, 1985. Police roadblocks went up so quickly and were so carefully guarded that some of the medical staff had trouble getting through to the hospital. (98)

EXAMPLE: Terrorist attack, World Trade Center, New York City, 2001. Police security lines impeded hospitals from transferring stable patients to nearby long-term care and mental health facilities and transporting discharged patients (or getting family members to pick them up) in order to make room for anticipated disaster victims. They also prevented vehicles from bringing supplies to hospitals from the outside and stopped what they considered “unessential” hospital staff (such as housekeeping) from coming to work when they were needed. (147)

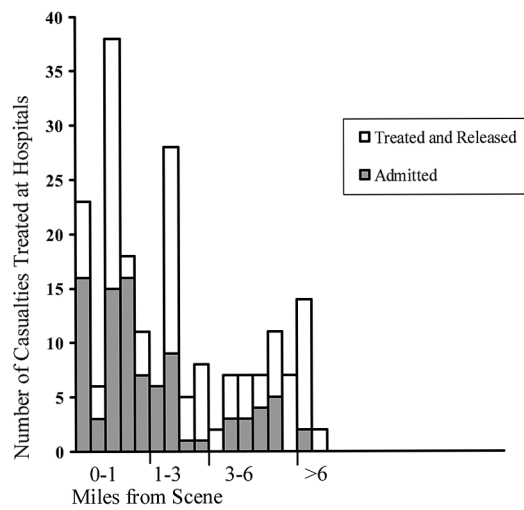
In disasters, a greater problem for police than looting is the need for traffic control, so that emergency units can get to the scene and patients can get to hospitals. Law-enforcement personnel frequently are also needed to help with search-and-rescue activities. While a police presence will help to assure residents and business owners worried about looters, units should not be unnecessarily diverted from traffic or other emergency duties to deal with the presumption that massive looting will occur.

Concluding Remarks

Disaster planning is only as good as the assumptions upon which it is based. Unfortunately, surveys of disaster and emergency response officials reveal a number of commonly held misconceptions that can lead to dysfunctional planning. (3) This chapter identifies some of the more common misconceptions about the public’s response to disaster and presents information from systematic studies of actual disasters. In particular, one of the most important lessons concerns the problems of using the command-and-control model of planning. It is more effec-

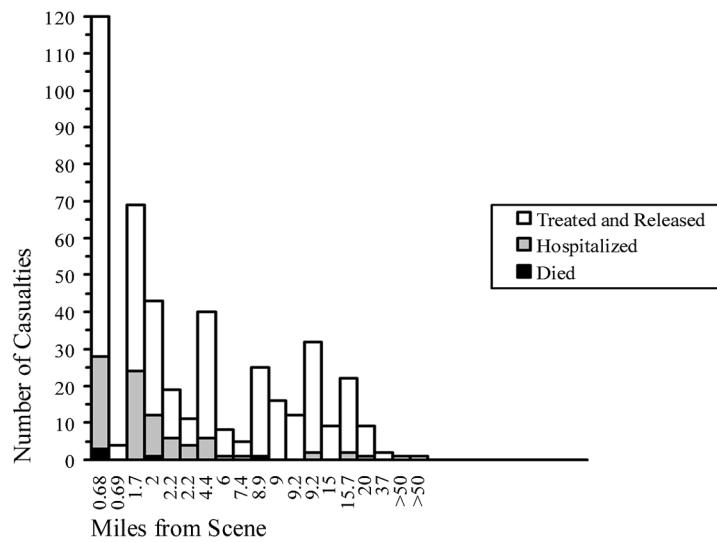
tive to learn what people tend to do naturally in disasters and plan around that rather than design your plan and then expect people to conform to it.

Figure 27.1: Kansas City Hyatt skywalk collapse – casualty distribution among the 17 (out of 26) hospitals that received patients.



Data from Hyatt Disaster Medical Assessment. Kansas City, Missouri: Kansas City Health Department; 1981.

Figure 27.2: Oklahoma City Bombing – Casualty distribution among the 19 (of 28) local hospitals that received casualties.



Data from Injury Prevention Service, Oklahoma State Health Department, Oklahoma City; 2002.

References

1. Quarantelli EL. *Delivery of Emergency Medical Care in Disasters: Assumptions and Realities*. New York: Irvington Publishers, Inc.;1983. <http://www.udel.edu/DRC/email.html> or <http://www.udel.edu/DRC/books.html>
2. Auf der Heide E. *Disaster Response: Principles of Preparation and Coordination*. St. Louis: CV Mosby; 1989. <http://orgmail2.coe-dmha.org/dr/index.htm>
3. Wenger DE, James TF, Faupel CE. *Disaster Beliefs and Emergency Planning*. New York: Irvington Publishers, Inc; 1985.
4. Quarantelli EL, Dynes RR. Introduction Special issue on organizational and group behavior in disaster. *American Behavioral Scientist*. January/February 1970;13(3):325–330.
5. Fischer HW, III. *Response to disaster, fact versus fiction and its perpetuation: the sociology of disaster*. Lanham, Maryland: University Press of America, Inc.; 1998. www.univpress.com
6. Tierney KJ, Lindell MK, Perry RW. *Facing the Unexpected: Disaster Preparedness and Response in the United States*. Washington, DC: Joseph Henry Press; 2001.
7. Mileti DS, Drabek TE, Haas JE. *Human Systems in Extreme Environments: A Sociological Perspective, Monograph No. 21, Program on Technology, Environment and Man*. Boulder, CO: Institute of Behavioral Science, The University of Colorado; 1975.
8. Glass TA, Schoch-Spana M. Bioterrorism and the people: how to vaccinate a city against panic. *Clinical Infectious Diseases*. 15 Jan 2002;34(2):217–223.
9. Goltz JD. Initial behavioral response to a rapid onset disaster. *International Journal of Mass Emergencies and Disasters*. Mar 1992;10(1):43–69.
10. Quarantelli EL. *How Individuals and Groups React During Disasters: Planning and Managing Implications for EMS Delivery*. Newark, DE: Disaster Research Center, University of Delaware; 1989.

11. Quarantelli EL. Mass behavior and governmental breakdown in major disasters: Viewpoint of a researcher. *Police Yearbook*. 1965:105–112.
12. Bryan JL. Human behavior in the MGM Grand Hotel fire. *Fire Journal*. March 1982;76:37–48.
13. Drabek TE. *Human System Responses to Disaster: An Inventory of Sociological Findings*. New York: Springer-Verlag; 1986.
14. Sime JD. The concept of “panic”. In: Canter D, ed. *Fires and fire behavior*. Chichester (UK), New York, Brisbane, Toronto: John Wiley & Sons; 1980:63–81.
15. Tomes N. The making of a germ panic, then and now. *American Journal of Public Health*. Feb 2000;90(2):191–198.
16. Oklahoma City Document Management Team. Murrah Rescue and Recovery Operation: Final Report to the Mayor and City Council; 1996.
17. Clarke L. Panic: myth or reality? *Contexts (American Sociological Association)*. Fall 2002:21–26. www.asanet.org/contexts
18. Quarantelli EL, Dynes RR. When disaster strikes (It isn’t much like what you’ve heard or read about). *Psychology Today*. February 1972:67–70.
19. Quarantelli EL. *The sociology of panic*. Newark, DE: University of Delaware, Disaster Research Center; 1999.
www.udel.edu/DRC/preliminary/pp283.pdf
20. Scanlon TJ. *Disaster Preparedness: Some Myths and Misconceptions: The Eastingwold Report*. Wallasey, UK: Eaton Press; 1992.
21. Dynes RR, Quarantelli EL, Kreps GA. *A Perspective on Disaster Planning*. 3rd ed. Columbus, OH: Disaster Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1981.
22. Quarantelli EL. *How Individuals and Groups React During Disasters: Planning and Managing Implications for EMS Delivery*. Newark, DE: Disaster Research Center, University of Delaware; 1989.

23. Drabek TE. *Emergency Management: The Human Factor*. Washington, DC: Federal Emergency Management Agency, National Emergency Training Center; 1985.
24. Keating JP. The myth of panic. In: Keating JP, ed. *Hotel Fires, Behind the Headlines*. Quincy, MA: National Fire Protection Association; 1982.
25. Dynes RR. *Organized Behavior in Disaster*. Columbus, OH: Disaster Research Center; 1974.
26. Quarantelli EL. Lessons from research. In: Anon., ed. *Seminar Report on Crises and the Media*. Easingwold, York, U.K.: Emergency Planning College; 1991.
27. Wood PG. A survey of behavior in fires. In: Canter D, ed. *Fires and fire behavior*. Chichester (UK), New York, Brisbane, Toronto: John Wiley and Sons; 1980:83–95.
28. Canter D, Breau J, Sime J. Domestic, multiple occupancy and hospital fires. In: Canter D, ed. *Fires and Human Behavior*. New York: John Wiley and Sons; 1980:117–136.
29. National Oceanic and Atmospheric Administration. Hurricane Carla [Internet]. Available at: <http://www.srh.noaa.gov/crp/docs/research/hurhistory/Carla/carla.html>. Accessed July 30, 2003.
30. Davenport S. *Human Response to Hurricanes in Texas—Two Studies, Working Paper Series, No. 34*. Boulder, CO: Natural Hazards Research and Applications Information Center, University of Colorado at Boulder; 1978.
31. Moore HE. *Before the Wind*. Washington, DC: National Academy of Sciences—National Research Council; 1963.
32. Best R. *Reconstruction of a tragedy: the Beverly Hills Supper Club Fire*. Washington, DC: National Fire Protection Association; 1977.
33. Nordberg M. United Flight 232: The story behind the rescue. *Emergency Medical Services*. November 1989;18(10):15, 22–31.
34. United States Fire Administration. The World Trade Center bombing: Report and analysis. *Federal Emergency Management Agency, United States*

Fire Administration, National Fire Data Center. 5 Jul 01. Available at: <http://www.usfa.fema.gov/applications/publications/techreps.cfm>.

35. Tierney K. Strength of a City: A Disaster Research Perspective on the World Trade Center Attack <http://www.ssrc.org/sept11>. *Social Science Research Council* [Internet]. Available at: <http://www.ssrc.org/sept11>. Accessed 23 Jun 03.
36. Aguirre BE, Wenger D, Vigo G. A test for the emergent norm theory of collective behavior. *Sociological Forum*. 1998;13:301–320.
37. Bronson W. *The Earth Shook, the Sky Burned*. Garden City, NY: Doubleday and Company Inc.; 1959.
38. Koegler RR, Hicks SM. The destruction of a medical center by earthquake: Initial effects on patients and staff. *Western Journal of Medicine*. February 1972;116:63–67.
39. Mitka M. Bioterror exercise tests agencies' mettle. *Journal of the American Medical Association*. Jun 11 2003;289(22):2927–2928.
40. Murakami H. *Underground: The Tokyo gas attack and the Japanese psyche*. New York: Vintage International; 2000. www.vintagebooks.com
41. Crosby AW. *America's Forgotten Pandemic*. Cambridge: Cambridge University Press; 1989.
42. Doty PM. A retrospect of the influenza epidemic. *Public Health Nurse*. 1919;11(12):949–957. <http://ublib.buffalo.edu/libraries/units/hsl/history/flu.html>
43. Foley EL. Department of public health nursing. *American Journal of Nursing*. 1918;19(3):189–195. <http://ublib.buffalo.edu/libraries/units/hsl/history/flu189.pdf>
44. Davies EJ. The influenza epidemic and how we tried to control it. *Public Health Nurse*. 1919;11(1):45–49. <http://ublib.buffalo.edu/libraries/units/hsl/history/flu45.pdf>

45. Kilijanek TS. *There She Blows: The Search and Rescue Response to the Mount St. Helens Volcano, Technical Report No. 11, SAR Research Project*. Denver: Department of Sociology, University of Denver; 1981.
46. Burton I, Victor P, Whyte A. *The Mississauga Evacuation: Final Report to the Ontario Ministry of the Solicitor General*. Toronto: Institute for Environmental Studies, University of Toronto; 1981.
47. Gray J, Baer N, Minutilli L, al. e. *Three case studies of organized responses to chemical disasters, Miscellaneous Report No. 29*. Columbus, OH: Disaster Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1981.
48. Whitehead JC. Heading for higher ground: factors affecting real and hypothetical hurricane evacuation behavior. *Department of Economics, East Carolina University* [Internet]. Available at: www.ecu.edu/econ/wp/00/ecu0006.pdf. Accessed June 23, 2003.
49. Paulison RD, Montes MF, Castillo CJ. Hurricane Andrew After Action Report (unpublished); 1992.
50. Fitzpatrick C, Mileti DS. Motivating public evacuation. *International Journal of Mass Emergencies and Disasters*. Aug 1991;9(2):137–152.
51. Edelman P, Herz E, Bickman L. A model of behavior in fires applied to a nursing home fire. In: Canter D, ed. *Fires and fire behavior*. Chichester (UK), New York, Brisbane, Toronto: John Wiley and Sons; 1980:181–203.
52. Perry RW. *Comprehensive Emergency Management: Evacuating Threatened Populations*. Greenwich, CT: JAI Press, Inc.; 1985.
53. Quarantelli EL. Images of withdrawal behavior in disasters: Some basic misconceptions. *Social Problems*. Summer 1960;8(1):68–79.
54. Maxwell C. Hospital organization response to the nuclear accident at Three Mile Island: Implications for future-oriented disaster planning. *American Journal of Public Health*. Mar 1982;72(3):275–279.
55. Quarantelli EL. The Grand Island, Nebraska tornado case study: Emergency sheltering aspects. *Sheltering and Housing After Major Community Disasters: Case Studies and General Observations*. Columbus: Disaster

- Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1982:55–72.
56. Cochrane HC, Grunfest E, Stokes M, Burgess H, al. e. Flash Flood on the Big Thompson: A Case Study; 1979.
57. Heath SE, Kass PH, Beck AM, Glickman LT. Human and pet-related risk factors for household evacuation failure during a natural disaster. *American Journal of Epidemiology*. 2001;153(7):659–665.
58. Federal Emergency Management Agency. *FEMA's Disaster Management Program: A Performance Audit After Hurricane Andrew*. Washington, DC: Office of the Inspector General, Federal Emergency Management Agency; 1993.
59. Crippen D. The World Trade Center attack, similarities to the 1988 earthquake in Armenia: time to teach the public life-supporting first aid? *Critical Care*. Dec 2001;5(6):312–314.
60. Lechat MF. Disaster as a public health problem. 1985.
61. Tierney K. *Project Summary: Disaster Analysis: Delivery of Emergency Medical Services in Disasters*. Newark: Disaster Research Center, University of Delaware; 1993.
62. Barton A. *Communities in Disaster: A Sociological Analysis of Collective Stress Situations*. Garden City, NY: Doubleday; 1969.
63. Fritz CE, Mathewson JH. *Convergence behavior in disasters: A problem in social control, Disaster Study No. 9, Publication No. 476*. Washington, DC: Committee on Disaster Studies, National Academy of Sciences-National Research Council; 1956.
64. Raker JW, Wallace AFC, Rayner JF. *Emergency Medical Care in Disasters: A Summary of Recorded Experience, Disaster Study No. 6, Publication No. 457*. Washington, DC: Disaster Research Group, National Academy of Sciences—National Research Council; 1956.
65. Williams HB, Rayner JF. Emergency medical services in disaster. *Medical Annals of the District of Columbia*. December 1956;25(12):655–662.

66. Drabek TE, Tamminga HL, Kilijaneck TS, et al. *Managing multiorganization emergency responses: Emergent search and rescue networks in natural disaster and remote area settings*. Boulder, CO: Natural Hazards Research and Applications Information Center, University of Colorado at Boulder; 1981.
67. Noji EK, Armenian HK, Oganessian A. Issues of rescue and medical care following the 1988 Armenian earthquake. *International Journal of Epidemiology*. 1993;22(6):1070–1076.
68. Auf der Heide E. Disaster planning, Part II: Disaster problems, issues, and challenges identified in the research literature. *Emergency Medicine Clinics of North America*. May 1996;14(2):453–480.
69. De Bruycker M, Greco D, Annino I, et al. The 1980 earthquake in southern Italy: rescue of trapped victims and mortality. *Bulletin of the World Health Organization*. 1983;61(6):1021–1025.
70. Roces M, Pastor N, Gopez I, Quizon M, al. e. Earthquake Disaster—Luzon, Philippines. *Morbidity and Mortality Weekly Report*. August 31 1990;39(34): 573–577.
71. Lechat MF. Natural and man-made disasters. In: Holland WW, Knox G, eds. *Oxford Textbook of Public Health*. Vol 1: Oxford University Press; 1984.
72. Noji EK. *The Public Health Consequences of Disasters*. New York: Oxford University Press; 1997.
73. O'Brien P, Mileti DS. Citizen participation in emergency response following the Loma Prieta earthquake. *International Journal of Mass Emergencies and Disasters*. Vol 10; 1992:71–89.
74. Oakland Fire Department. *Oakland Fire Department Earthquake Report*. Oakland, CA: City of Oakland, California, Fire Department; 1990.
75. Yong C, Tsoi K-I, Feibi C, et al. *The Great Tangshan Earthquake of 1976: An Anatomy of Disaster*. New York: Pergamon Press; 1988.
76. Dynes RR, Quarantelli EL, Wenger D. *Individual and Organization Response to the 1985 Earthquake in Mexico City, Mexico, Book and Monograph Series #24*. Newark, DE: Disaster Research Center, University of Delaware; 1990.

77. Seismic Safety Commission. *Preliminary Reports Submitted to the Seismic Safety Commission on the May 2, 1983 Coalinga Earthquake, Publication No. SSC 83-08*. Sacramento: Seismic Safety Commission; 1983.
78. Wenger D, Quarantelli EL, Dynes R. *Disaster Analysis: Emergency Management Offices and Arrangements, Final Project Report #34*. Newark, DE: Disaster Research Center, University of Delaware; 1986.
79. Dynes RR. Organization involvement and changes in community structure in disaster. *American Behavioral Scientist*. January/February 1970;13(3):430-439.
80. Rosow I. *Authority in Emergencies: Four Tornado Communities in 1953*. Columbus: Disaster Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1977.
81. Moore HE. *Tornados Over Texas: A Study of Waco and San Angelo in Disaster*. Austin: University of Texas Press; 1958.
82. Auf der Heide E. Principles of hospital disaster planning. In: Hogan D, Burstein JL, eds. *Disaster Medicine*. Philadelphia: Lippincott Williams and Wilkins; 2002:57-89.
83. Tierney KJ. *Emergency Medical Care Aspects of the Loma Prieta earthquake*. Newark, DE: Disaster Research Center, University of Delaware; 1992.
84. Oklahoma State Department of Health. Summary of physical injuries directly associated with the Oklahoma City Bombing; 1995.
85. Maningas PA, Bobison M, Mallonee S. The EMS response to the Oklahoma City bombing. *Prehospital and Disaster Medicine*. 1997;12(2):80-85.
86. Koehler G, Isbell D, Freeman C, al. e. *Medical Care for the Injured: The Emergency Medical Response to the April, 1992, Los Angeles Civil Disturbance, EMSA #393-01*. Sacramento: State of California, Health and Welfare Agency, Emergency Medical Services Authority; 1993.
87. Okumura T, Suzuki K, Fukuda A, et al. The Tokyo Subway sarin attack: disaster management, part 1: community emergency response. *Academic Emergency Medicine*. June 1998;5(6):613-617.

88. Guttenberg MG, Asaeda G, Cherson A, Richmond N, Gonzalez D, Clair J. Utilization of ambulance resources at the World Trade Center: Implications for disaster planning. *Annals of Emergency Medicine*. Oct 2002;40(4):S92.
89. Arlington County Fire Department. After-Action Report on the Response to the September 11 Terrorist Attack on the Pentagon. *Arlington County (Virginia) Fire Department* [Internet]. Available at: <http://www.mipt.org/pdf/pentagonafteractionreport.pdf>, 2002.
90. Neff JL. Responsibility for the delivery of emergency medical services in a mass casualty situation: the problem of overlapping jurisdictions. *Mass Emergencies*. 1977;2:179–188.
91. Golec JA, Gurney PJ. The problem of needs assessment in the delivery of EMS. *Mass Emergencies*. 1977;2:169–177.
92. Henry S. Mississauga Hospital: Largest evacuation in Canada's History. *Canadian Medical Association Journal*. 1980;122:582–586.
93. California Association of Hospitals and Health Systems. *Hospital Earthquake Preparedness: Issues For Action, A Report on the Loma Prieta Earthquake Issued October 17, 1990*. Sacramento: California Association of Hospitals and Health Systems; 1990.
94. Martchenke J, Pointer JE, Michaelis J, al. e. Hospital disaster operations during the 1989 Loma Prieta earthquake. *Prehospital and Disaster Medicine*. July-September 1994;9(3):146–153.
95. Drabek TE. Disaster in Aisle 13 revisited. In: Dynes RR, Tierney KJ, eds. *Disasters, Collective Behavior, and Social Organization*. Newark, DE: University of Delaware Press; 1994:23–25.
96. Landesman LY. *Emergency Preparedness in Health Care Organizations*. Oakbrook Terrace, IL: Joint Commission on Accreditation of Healthcare Organizations; 1996.
97. Stallings RA. Differential response of hospital personnel to a disaster. *Mass Emergencies*. October 1975;1(1):47–54.
98. Morris BAP, Armstrong TM. Medical response to a natural disaster: The Barrie tornado. *Canadian Medical Association Journal*. 1986;134:767–769.

99. Haynes BE, Freeman C, Rubin JL, al. e. Medical Response to Catastrophic Events: California's Planning and the Loma Prieta Earthquake. *Annals of Emergency Medicine*. April 1992;21(4):368–374.
100. Edelstein S. Metro subway accident. In: Cowley RA, ed. *Mass Casualties: A Lessons Learned Approach, Proceedings: First International Assembly on Emergency Medical Services, Baltimore, June 13–17, 1982, DOT HS 806 302*. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration; 1982:157–162.
101. Palafox J, Pointer JE, Martchenko J, al. e. The 1989 Loma Prieta earthquake: Issues in medical control. *Prehospital and Disaster Medicine*. October–December 1993:291–297.
102. Gray C, Knabe H. The night the skywalks fell: 111 dead, 188 injured in Kansas City hotel collapse. *Firehouse*. September 1981;6:66–70, 132–133.
103. American College of Emergency Physicians. *EMTALA Information Packet*. Dallas 2003.
104. Anonymous. A Review of the Effectiveness of Communications During and Shortly After the Loma Prieta, California, Earthquake. *Disaster Management*. 1990;3(2):83–89.
105. Arnold C, Durkin M. *Hospitals and the San Fernando earthquake of 1971: The operational experience*. San Mateo, Inc.: Building Systems Development, Inc.; 1983.
106. Federal Emergency Management Agency. *The Loma Prieta (San Francisco/ Monterey Bay) Earthquake: Emergency Response and Stabilization Study*. Washington, DC: Federal Emergency Management Agency; 1991.
107. Klein JS, Weigelt JA. Disaster management: lessons learned. *Contemporary Problems in Trauma Surgery*. April 1991;71(2):257–266.
108. Maxwell C. Commentary: Hospital Organization Response to the nuclear accident at Three Mile Island: Implications for future-oriented disaster planning. *American Journal of Public Health*. March 1982;72(3):275–279.
109. Richwagen WC. The 'predictive' approach to disaster planning: How it failed. *Hospitals, JAHA*. August 1967;41:48–50.

110. Shaftan GW. Disaster and medical care. *Journal of Trauma*. 1962;2:111–116.
111. McCann J. Disaster drills pay off in VT Amtrack wreck: minor problems include need to triage x-ray. *Emergency Department News*. Sept 1984;6(9):9, 20.
112. Kennedy WC. *Some Preliminary Observations on a Hospital Response to the Jackson, Mississippi Tornado of March 3, 1966, Research Report 17*. Columbus: Disaster Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1967.
113. Scanlon J, Padgham M, Star W. *The Peel Regional Police Force and the Mississauga Evacuation: How a Police Force Reacted to a Major Chemical Emergency*. Ottawa: Canadian Police College; 1980.
114. Alberta Public Safety Services. *Tornado, A report: Edmonton and Strathcona County, July 31st, 1987*. Edmonton, Ontario, Canada: Alberta Public Safety Services; 1991.
115. Manzi C, Powers MJ, Zetterlund K. *Critical information flows in the Alfred P. Murrah Building bombing: a case study*. Washington, DC: Chemical and Biological Arms Control Institute; 2002. Special Report 3. www.cbaci.org/main.htm
116. Quarantelli EL. *Organization Behavior in Disasters and Implications for Disaster Planning, Report Series 18*. Newark: Disaster Research Center, University of Delaware; 1985.
117. Alson R, Alexander D, Leonard RB, et al. Analysis of medical treatment at a field hospital following Hurricane Andrew, 1992. *Annals of Emergency Medicine*. November 1993;22(11):1721–1728.
118. Glover J, Conner SM. Sioux City manages an air disaster. *Plant, Technology and Safety Management Series*. 1990(2 (Emergency Preparedness: When Disaster Strikes)):7–11.
119. Oklahoma Department of Civil Emergency Management. *After Action Report: Alfred P. Murrah Federal Building Bombing, 19 April, 1995, Okla-*

- homa City, Oklahoma*: State of Oklahoma, Department of Central Services, Central Printing Division; 1995.
120. Misegades L. *Phone lines and life lines: how New York reestablished contact on September 11, 2001*. Washington, DC: Association of State and Territorial Health Officials; 2002.
<http://www.astho.org/?template=1bioterrorism.html>;
121. Emerson B. Cellphones come through when emergencies strike. *The Atlanta Journal-Constitution*. September 23 2001;G7.
122. Quarantelli EL. The community general hospital: its immediate problems in disasters. *American Behavioral Scientist*. January/February 1970;13(3):380–391.
123. Dynes RR. Community Emergency Planning: False Assumptions and Inappropriate Analogies. *International Journal of Mass Emergencies and Disasters*. August 1994;12(2):141–158.
124. Tierney KJ. *A Primer for Preparedness for Acute Chemical Emergencies, Book and Monograph Series No. 14*. Columbus: Disaster Research Center, The Ohio State University (now relocated to the University of Delaware, Newark); 1980.
125. Fechtel EJ. How St. Mary's Hospital, Athens, Ga. handled a recent tornado disaster. *Hospital Progress*. August 1973;54(8):38–40.
126. Morris GP. The Kenner Airliner Disaster: A 727 falls into a New Orleans suburb. *Journal of Emergency Medical Services*. September 1982;7(9):58–65.
127. Kallsen G. Collapse of Coalinga. *Journal of Emergency Medical Services*. July 1983;8(7):24–29.
128. McKinsey and Company. The McKinsey Report—Increasing FDNY's Preparedness. *McKinsey and Company* [Internet]. Available at: www.nyc.gov/html/fdny/htmlmck_report/toc.html. Accessed 8/30/02, 2002.
129. Uранеck K. Emergency physicians offer help-but find few takers. September 21, 2001. Available at: www.acep.org/2,2958,0.html.

130. Lowe S. *Community response in a terrorist disaster*. Boulder: University of Colorado; 2002. 144. www.colorado.edu/hazards/qr/qr144/qr144.html
131. Seaman J, Leivesley S, Hogg C. *Epidemiology of Natural Disasters*. New York: S. Karger; 1984.
132. Kerns DE, Anderson PB. EMS response to a major aircraft incident: Sioux City, Iowa. *Prehospital and Disaster Medicine*. April–June 1990;5(2):159–166.
133. U.S. Fire Administration. *Urban Search and Rescue in the Santa Cruz Area Following the Loma Prieta Earthquake*. Washington, DC: United States Fire Administration, Federal Emergency Management Agency; 1992. www.usfa.fema.gov/usfapubls/
134. Pointer JE, Michaelis J, Saunders C, al. e. The 1989 Loma Prieta earthquake: Impact on hospital patient care. *Annals of Emergency Medicine*. Oct 1992;21(10):1228–1233.
135. Noji EK. Analysis of medical needs during disasters caused by tropical cyclones: anticipated injury patterns. *Journal of Tropical Medicine and Hygiene*. 1993;96:370–376.
136. Seamon J, Leivesley S, Hagg C. The practical application of epidemiological methods to disasters. In: Seamon J, Leivesley S, Hagg C, eds. *Epidemiology of Natural Disasters*. Basel: S. Karger AG; 1984.
137. Cihlar C. Hospitals respond efficiently to Chicago's worst train wreck. *Hospitals, JAHA*. November 16 1972;46:17–17b.
138. Drabek TE. *Disaster in aisle 13: A case study of the coliseum explosion at the Indiana State Fairgrounds, October 31, 1963*. Columbus, OH: College of Administrative Science, The Ohio State University, Columbus, 1968; (now relocated to the University of Delaware, Newark); 1968.
139. Dynes RR. Interorganization relations in communities under stress. In: Quarantelli EL, ed. *Disasters: Theory and Research*. Beverly Hills, CA: Sage Publications; 1978.
140. Marks ES, Fritz CE, al. e. *Human Reactions in Disaster Situations*. Vol 1–3. Chicago: National Opinion Research Center, University of Chicago; 1954.

141. Patterson P. OR staffs respond to Hyatt casualties. *AORN Journal*. September 1981;34(3):411–416.
142. Kansas City Health Department. *Hyatt Disaster Medical Assessment*. Kansas City, MO: Health Department, Kansas City, MO; 1981.
143. Governor's Office of Emergency Services. *Law Enforcement Operations Report: Loma Prieta Earthquake*. Sacramento: State of California, Governor's Office of Emergency Services, Law Enforcement Division; 1990.
144. McKinsey & Company *Improving NYPD emergency preparedness and response*. New York: New York City Police Department; 2002.
145. Blanshan SA. A time model: Hospital organization response to disaster. In: Quarantelli EL, ed. *Disasters: Theory and Research*. Beverly Hills, CA: Sage Publications; 1978:173–198.
146. Mangum WP, Kosberg JI, McDonald P. Hurricane Elena and Pinellas County, Florida: Some lessons learned from the largest evacuation of nursing home patients in history. *The Gerontologist*. June 1989;29(3):388–392.
147. Joint Commission on Accreditation of Healthcare Organizations. Special issue: Emergency management in the new millennium. *Joint Commission Perspectives*. Dec 2001;21(12).