Social Scientific Insights on Preparedness for Public Health

Emergencies

A Report Prepared by the Disaster Research Center for the Delaware Department of Health and Social Services, Division of Public Health, Disaster Preparedness Section.

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**Introduction to the Report**

It is common for governmental agencies to plan for emergencies. It’s human nature that we want to reduce our exposure to the dangers around us. While risk reduction happens at many levels (e.g. individual, family, organizational, community, and state) government agencies play a key role in ensuring the safety and security of the citizenry. The Delaware Health and Social Services agency (DHSS) is no different. With a mission to: "improve the quality of life for Delaware's citizens by promoting health and well-being, fostering self-sufficiency, and protecting vulnerable populations," disaster response neatly falls into the agencies prevue. Equally important, the agency strives to be a self-correcting organization working to retool and keep pace with changing client needs and a changing service delivery environment. Such a vision requires informed decision-making. As a result the Division of Public Health’s Disaster preparedness section contracted the Disaster Research center at the University of Delaware to produce a document that provides sound knowledge from evidence based assessments of planning and response to public health emergencies. The goal of this effort is to maximize the ability of DE officials to prevent, avoid, respond, and recover from major public health emergencies through a review of the evidence based research related to this topic. This report will cover a number of issues, but it focuses most directly on social science insights that can be of value to planning and response processes. Pursuing to contract specifications, this report consists of three parts. The first part presents some of the most important research themes in disaster science. The second part presents an annotated bibliography of public health and disaster. The third part provides answers to a series of questions Division of Public officials asked DRC to answer. The first two sections are based on research findings. In the final section we provide our expert opinions based on scientific knowledge, but not in every instance drawn exclusively from research findings.
Part 1-Themes in the Social Science of Disasters

This section reviews and summarizes some of the most important research themes in the sociology, social science, and public health studies of disasters. Our findings are separated into two sections, in the first section we consider what have come to be known as “disaster myths.” Here we address: mass panic; individuals’ inability to cope; community social disorganization; role abandonment; and looting. In the second section, we discuss a number of social science findings with direct implications for disaster planning including: the new theory of emergency planning; integrated warning systems; convergence; socio-cultural emergence; search and rescue; deaths and injuries; and mental health. DRC staffers have generated a great deal of this knowledge during more than 40 years of research, but where appropriate we have also drawn from other relevant sources which are also integrated into the text.

Disaster “Myths”

More than a quarter of a century ago, researchers (Dynes, Quarantelli and Kreps 1981) identified what they called the “popular image of disaster behavior.” They argued, based on an analysis of years of research on disasters, that the popular image was based on themes of personal disorganization and chaos. The general assumption most people make is that:

1. When faced with great threat or danger people will panic, typified by wild flight or hysterical breakdowns, and will show little consideration for the welfare of others.

2. Those who do not act irrationally are often immobilized by major emergencies. They are dazed, shocked and unable to cope, suffering severe emotional scars and mental health disturbances.

3. Due to the aforementioned difficulties, the ability of local organizations to perform effectively in handling emergency tasks is severely limited.

4. The social disorganization of the community provides the conditions for the surfacing of anti-social behavior.

5. Community morale is very low in disaster-stricken areas.

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1 Some of the material in this article is used here with their permission.
6. A descent into total personal and social chaos is possible in such stricken communities.

7. Officials lack the resources and are so shaken by the disaster that they cannot take the drastic steps required to prevent such deterioration.

As these authors pointed out at the time, many of these beliefs are not well founded; a conclusion that has been reinforced by the findings of many researchers. As recently as a few years ago, Quarantelli examined the extensive body of research amassed over the last 50 years and asked if there is reason to believe the situations underlying “disaster myths” are more prevalent in modern society. He found that most people do not panic; most people do not abandon important social roles, and most people are not helpless (to the contrary most people rise to the challenges posed by disasters). In turning to the other myths, it is important to note that although not absent looting is still very rare in typical disasters in Western type societies. While mass looting can occur in catastrophes, which are different from disasters, if some other facilitating social conditions are present, most research suggests this is a much smaller problem than is often believed. Even post Katrina research has suggested that media portrayals of looting may have been overstated (Barsky et al. 2007). The most difficult issues to unpack is the question of severe mental health consequences. More than any other “myth of disasters” this has come to be disputed by two competing points of view that are not easily reconcilable (see below). Here we present a summary of these key “disaster myths.”

**Widespread Panic**

R. Dynes points out that, “as is the case with every myth, panic, “an acute reaction involving terror, confusion, and irrational behavior,” has complex origins and meanings. It is an emotional word that has been used in different ways at different times throughout history. Widely used today, it is often associated with social response to a disaster. It is expected by officials and laypeople, and perpetuated by media and popular culture, that when disaster strikes, panic will ensue, and social norms will break down.” He reminds us that in “modern societies that emphasize individualism and psychological states, panic is frequently used to describe our personal reaction to problematic situations, which are unexpected and possibly threatening and uncertain.” Dynes also writes that the conventional meaning of panic “centers on the notion of irrational and rapid physical flight in situations considered dangerous to the persons involved. It
is also often believed that panic is contagious (if one person panics and flees, others will follow, which exacerbates the problem).” The idea that people will panic in the face of danger is common; however, the research suggest that the opposite behavioral response is far more likely. People often stay in potentially threatening situations rather than move out of them. Human beings have very strong tendencies to continue with on-going lines of behavior rather than initiate new courses of action. For example, the unwillingness of residents to withdraw from threatened localities has been documented for disaster agents ranging from floods and avalanches where there is usually considerable forewarning to tornadoes and explosions where warning time might be rather short.

The notion of whole communities fleeing irrationally after receiving a warning is not supported by systematic studies. In most cases the evidence indicates that the withdrawal behavior that does occur is primarily by transients, such as tourists, not by the resident population. Even during mandatory evacuations of an area, it is the case that many people simply do not leave. A number of studies of hurricane evacuations have shown that despite intensive warning campaigns and the use of the mass media, close to a half of the population of threatened areas simply refuse to evacuate, with significant proportions staying in their own homes. There is far more of a problem in getting movement than there is in preventing unruly or disorderly flight or wild panic -- the latter problem almost never exists. Panic episodes tend to be extremely localized. They typically involve very few participants, and are of very short duration. In the famous Invasion from Mars broadcast, upon close examination, it was found that there was extremely little behavior leading to the cessation of traditional role playing. 84 percent of the audience was in no way even disturbed by the broadcast. Even in such historically famous cases as the Cocoanut Grove night club fire, the available evidence fairly clearly suggests that panic was not the primary form of withdrawal even given the highly dangerous emergency situation. To the contrary, many people died from asphyxiation before they even realized there was danger. The majority that escaped sought out alternate escape routes in a reasonable fashion with friends. Here as well as in other similar situations there was none of the widespread contagion that a panicky reaction is supposed to evoke automatically among those exposed to it. There is, furthermore, a frequently overlooked but fundamental difference between panics, a recognized medical condition, and flight behavior. Flight behavior is social behavior guided by traditional
social roles. A number of studies have shown that evacuees move in groups and family units and remain together in shelters in order to help each other along the way.

Victims Dazed and Unable to Cope

A form of shock reaction, called a "disaster syndrome," has sometimes been observed in the aftermath of relatively sudden and extensive disasters. It involves an apathetic response and some disorientation in thinking. However, the "disaster syndrome" does not appear in great numbers of people; seems confined only to the most sudden traumatic kinds of disasters; has been reported only in certain cultural settings; and is generally of short duration, hours only, if not minutes. Just as the panic image of disaster behavior is generally incorrect, so is the view that disasters leave victims dazed and disoriented both at time of impact and in the recovery period. Almost every systematic study in the US context suggests that those who experience disasters are not immobilized by even the most catastrophic of events. They are not passively dependent. They do not simply expect that others, especially relief and welfare workers, will take care of them and their disaster-created needs. In fact, disaster victims often insist on responding on their own even contrary to the expressed advice of the public authorities and formal agencies. One study of an extremely extensive tornado, using an area probability sample, found that only 14 percent of all victims might have manifested some aspects of the initial stages of the syndrome. In general, disaster victims react in an active manner, and do not wait around for assistance by outsiders or offers of aid from organizations. They show considerable personal initiative and a pattern of self and informal mutual help, such as contacting their kin for help rather than use public shelters. The evidence in facts is rather strong that far from seeking and being dependent on formal disaster organizations, these agencies are the last source that victims turn to for help. For most people there is a hierarchy of assistance seeking that runs from the more informal, intimate groups to formal, less familiar organizations. Thus, people first seek help from family and friends; then they turn to larger membership groups to which they belong (e.g., churches, work places, etc.) They look to other individual members of the community next. Only if these sources prove unavailable do they seek assistance from the more impersonal formal organizations, such as the police and welfare departments. Usually the last place people look for assistance is from special disaster agencies. Activity rather than passivity of victims characterizes not only the immediate emergency impact period but also the longer-run
rehabilitation stage. Even under very severe stress, people do not become either totally irresponsible or dependent, or completely impotent and immobilized. In general, the same can be said of the vast majority of disaster victims as generally has been said of combat soldiers, for both are able to control their fears and to act rationally and often effectively.

Community Disorganization

The assumption that local organizations are unable to cope with disasters is based both on the notion that these organizations and the communities in which they are located are overwhelmed by disaster impact, and also by the fear that the employees of these organizations are so affected by disaster impact that their efficiency is reduced. Neither of these notions stands up well to systematic observation. The notion of communities being overwhelmed is usually derived from overestimating the amount of disaster-occasioned demand on facilities and underestimating the number of resources still available after impact. In all disasters in recent years in the United States, the amount of destruction in relation to total resources is quite low; the same is true with regard to the ratio of casualties to the total population base involved. Despite the relative scale of Katrina there is a tendency to focus on the negative elements and ignore the positive outcomes. The truth is that millions of people evacuated successfully from New Orleans. It is also true that the majority of key institutions in the states in the region continued to function, that the number of victims, despite appalling numbers, were not very large as a proportion of the total population in the region. For example, if a disaster in a community of 100,000 persons destroys the housing of 10,000 persons, this means that 90,000 still have homes. Neighbors and relatives are usually more than accommodating in such situations. Since there are alternatives available, victims usually do not seek out public agencies to provide shelter. While shelters can be set up in the many public and private buildings which are still left and can serve a marginal function, most "displaced persons" will seek their own accommodations.

Outsiders' judgment of community needs in almost always an over estimate. For example, food supplies, available in households, retail groceries and in wholesale warehouses are usually sufficient to maintain all the members of most communities for several weeks. Clothing is generally not needed on a large scale. During the emergency period, persons in the impact area do not eat more than they usually do. (In fact, one might make the case that, in some instances, they might eat better since power disruptions often cause havoc with frozen food supplies. This
sometimes makes delicacies available at unexpected times). Medical supplies are in most instances available in hospital stocks or by wholesalers within the community or nearby. Nor is the casualty rate so high that locally available medical supplies, personnel and facilities, cannot absorb it. It is important to examine cases where these conditions are not met, but it is vital to note that in most instances communities are not completely overwhelmed. It is important however to contrast this with the possibilities of a major pandemic or epidemic. Although there is not considerable literature on the topic, many experts believe a major pandemic or epidemic has the potential to go well beyond the capacity and resources of health care providers. It is important to take this reality into account for these types of events.

Role Abandonment

The overestimation of demand also leads to the assumption that when a large number of persons are affected by a disaster agent, those who man local organizations will be unable to fulfill their emergency responsibilities. This has not been shown to be the case. Only in the most exceptional situations are personnel in local organizations affected in a way that makes them unable to cope with the immediate emergency demands. In reality, most emergency organizations such as police, fire departments, hospitals, etc. have a significantly larger number of personnel available to man their organization than is needed at any one time. Since they traditionally operate on a 24-hour basis, most have from two to three times the number of personnel necessary to do normal activities. Such personnel know they may be needed in such emergencies. They usually stay on the job after their shift is finished or they report to duty, either on their own or on notification. In addition to these "excess" personnel available in the more critical emergency organizations, there are many normal activities of the community which temporarily become irrelevant during a widespread disaster so that persons who normally are engaged in these non-essential tasks are free to provide assistance in critical roles. For example, in situations of widespread impact, educational institutions usually close. This means that school officials, teachers, maintenance personnel as well as students are available for volunteer help. The same is true of non-essential business offices and their personnel. In fact, a major problem in most disaster situations is the flood of volunteers who are ready and willing to help and the rather universal inability of organizations to utilize them effectively.
Even in spite of the availability of regular personnel in critical emergency organizations as well as the potential availability of masses of volunteers, fear is often expressed in the planning literature as to the deleterious effect of role conflicts that many persons are assumed to face. This conflict is thought to be between emergency-relevant occupational responsibilities and familial obligations. Such a situation could possibly occur, but in interviewing around 3,500 organizational personnel in about 100 disaster events and obtaining reports on the behavior of thousands of other workers, we have never found a case where a person abandoned an important emergency-related responsibility because of anxiety for their family members. A person on the job in an emergency-relevant organization when disaster impact occurs is quite likely to be the recipient of more accurate information as to the nature and scope of impact so that he/she can make a determination of possible injury to family members. The image that persons in a disaster area immediately abandon their emergency responsibilities to determine the safety of their families is simply not the case. In addition, depending on the timing of disaster impact, not all such "responsible" individuals are on the job when impact occurs. Those who are at home can make a quick determination of the safety of their family and then report to work. Such momentary delays do not hamper the initial functioning of emergency agencies and even long delays or even the loss of certain organizational personnel does not seriously affect organizational functioning since such groups generally have both available replacements and many volunteers. Even with the assessment of possible injury and in the absence of information to confirm or deny this, persons in responsible emergency roles still do not abandon them. Even if many did, there would be sufficient personnel to take over their responsibilities. Besides, there are many single, unattached persons within every community population. The persistent notion that local organizations become ineffective because of the fear, anxiety and helplessness on the part of their members is simply not true. To our knowledge, the only well documented cased of role abandonment involved the New Orleans Police department post Katrina. It should be noted however that many believe this phenomenon was more related to preexisting tensions and problems in the department that were exacerbated by the disaster rather than simply be ingenerate by the event.

Despite the pattern in natural disasters, there are important questions to be asked in regard to pandemics, epidemics, and major emergencies caused by biological weapons. These kinds of events are likely to cause a number of anxieties in health personnel that must be
addressed by planners (Parkin, 2008). For example, in Israel, 58% of health care workers were unwilling to go to work during an unconventional missile attack (Shapira, Maranitt and Roxiner 1991). In Hawaii, the willingness of doctors and nurses to go to work varied by whether the emergency was caused by a natural hazard, their perception of risk, their perception that they would be able to deliver appropriate care, and their knowledge of the situation (Lanzilott, Galanais and Leoni 2002). In New York City, studies of the health care system in the post 9.11 environments found that health workers’ willingness to go to work depended on childcare and eldercare, transportation difficulties, health concerns, and compensation (Qureshi, Gershon and Sherman 2005). Replicating findings in the sociology of disasters, (DiMaggio et al. 2005); see also (Reilly, Markenson and DiMaggio 2007) showed that fear of personal and family safety, as well as perception of poor training and equipment militated against showing to work in disasters.

In Toronto, during the 2003 SARS incident, public health institutions had a difficult time providing care due to personnel shortages. Many health workers self quarantined for fear that they would infect their patients (Chua, Cheung and Cheung 2004); (Koh, Lim and Chia 2005); (Stein, Tanielian and Eisenman 2004); (Maunder 2004); (Silverman, Simor and Loufty 2004); (Maguire, Dean and Bissell 2007). In Australia, paramedics would have a lower probability of showing to work if they felt that their co workers were infected and if they did not believe in the effectiveness of their protective devices (Watt, Tippett and Raven 2007). In Germany, reacting to the possibility of an influenza pandemic, almost a third of the respondents stated that it would be appropriate for health care workers not to come to work to protect themselves and their families. Similarly, a third of hospital administrators were unwilling to work during the incident (Ehrenstein, Hanses and Salzberger 2006). To summarize the consensus: health workers are more willing to come to work if they think their roles are important and if they feel they could be effective; if their place of work is perceived as safe; if they feel they can make an accurate risk assessment and whether they can trust their employers to give them accurate information about what is going on; if their traveling to work is not dangerous; if their perceived probability of infection is low and their protective gear is good; and if they perceive that their families are safe and well taken care of during the incident. Foremost in the minds of health care workers are their access to community resources if injured by the incident, their safe transportation, the safety of their families, child care, and the financial support to these workers if they become ill due to their participation in the response.
**Looting**

People often think that anti-social behaviors such as looting are widespread after a disaster. The term looting has military roots related to the activities of invading armies who took property by force, generally when the rightful owner cannot protect it. According to common belief, during disasters “invading armies of opportunists” take property left unguarded when the rightful owner is forced out by the disaster. This is an important misconception, because the expectations people have that looting will occur affect the protective actions they are likely to take since residents are concerned about possible looting. This behavior is “justified” in the minds of non-evacuees when reports of looting to spread through a community confirming their initial expectations. Despite these beliefs, in looking at the research literature it is difficult to find actual cases of looting. (Fischer 1998); (Quarantelli 1994b); (Siman-Zakhari 1988); (Gray and Wilson 1984); (Goltz 1984). It is simply an uncommon response to disasters. The truth is that people much more often engage in helping rather than exploitive behavior.

Contrary to a widespread belief, there has never been in the history of the United States the necessity to declare martial law in a disaster area. Even research evidence related to Hurricane Katrina, an event that to many appeared to be an exception to this pattern, has suggested that looting was minor rather than widespread issue. Lauren Barsky (2006) and her colleagues from DRC examined the matter of looting in this incident, said to be the worst disaster in the history of the United States. Based on the belief that there is a fundamental difference between survival and personal gain, they tried to empirically separate “looting” or taking non-essential items like televisions from taking essential items from what they called “appropriating behavior” or taking items necessary for survival such as baby food and water. These researchers reported that there were many stories of both looting and appropriating behavior occurring following the storm but their ultimate conclusion was that when they probed for a deeper explanation that most of the activity was related to “appropriating behavior” not “looting.” An Amtrak police officer—who was stationed at the Union Passenger Terminal in downtown New Orleans, which had been converted into a temporary jail for looters, commented that looting occurred mainly during the first week after the storm. According to this officer, the majority of the looting involved the taking of need-based items rather than luxury items. He estimated that 75 percent of the cases involved individuals taking items necessary to stay alive, and the remaining 25 percent involved individuals taking items that were not essential for
survival. Of the 25 percent who took luxury items, he speculated that the majority of them were already criminals, and it was the lack of law enforcement that brought about the looting. In both New Orleans and Slidell officials interviewed spoke of arrests made for the looting of nonessential items. These officials made references to cases of appropriating behavior but did not mention that arrests were made in these cases. A major finding that emerged from their research was that there is no clear definition that is accepted by the general public or agents of social control that would separate looting from appropriating behavior. The issue of what differentiates appropriating behavior from looting is debatable and depends primarily on an individual's perception of the situation (Barsky 2006). Therefore, what one officer could have viewed as looting, resulting in an arrest, may have been seen as appropriating behavior by another. The impact that media reports on looting had on disaster response operations and citizens was observed in interviews with evacuees and officials of the Federal Emergency Management Agency (FEMA). One evacuee at a mass care shelter in Baton Rouge stated that police had to force him to evacuate from his apartment after the flooding. He did not willingly leave his home because of the reports of looting on the news. This reinforces the findings about looting, that asserts that individuals' fear of property being stolen factors into their evacuation decision-making during a disaster event (Fischer 1998). In another instance, a FEMA official provided an example of what the agency actually did to guard the medical supplies that conflicted with the media's portrayal of the situation. This official spoke about a situation in which members of FEMA were asked by owners of a New Orleans pharmacy to take care of the medical items belonging to that pharmacy. According to this official, the way the media portrayed the situation made it appear as if members of FEMA were breaking into the pharmacy and looting items. A report made in USA Today stated that, "after the hurricane, the city just let loose." This statement contradicts reports made by a number of individuals interviewed that many people behaved positively in the aftermath of the hurricane. In their reporting on post-Katrina related looting, the media did not provide accurate information. There were cases, in which the media reports conflicted with more detailed findings made by our on-site research team and follow-up inquiries by major agencies. An overall theme that emerged when speaking to organizational actors was that there were more reports of looting in downtown New Orleans than in areas outside of the city. According to a New Orleans law enforcement official, instances of looting were low in the first week after Hurricane Katrina and during Hurricane Rita but spiked when the central city
was reopened to citizens. Statistics obtained from the official stationed at the temporary jail for looters in downtown New Orleans showed that as of September 28, the day the interview was conducted, 237 reports had been made at the facility since it was established. When we contrast these numbers with reports from Slidell police officials that only five or six people were arrested for breaking into stores and taking luxury items, we see a major difference in the two communities.

Many evacuees were under the impression that the looting that did occur was just a manifestation of what already occurs in society, and that those who did loot were those individuals who would partake in antisocial behavior. This view was shared by a number of officials in both New Orleans and Slidell. A sergeant in the Slidell police force expressed this view when he stated that he recognized some of the looters as individuals with prior arrest records. Some looting may have been the result of behavior stemming from social inequality. Even if we compare looting in New Orleans to the average day the level of crime appears to be lower. Police Department Technical Services Bureau Information Systems and Services Division reported that there were a total of 17,782 instances of theft and burglary in 2004 in the City of NO; that averages out to 48.7 reported burglaries or thefts per day. In comparison less than 15 reports of looting had occurred post-Katrina. These statistics actually suggest a decrease in arrests for similar types of offences following Hurricane Katrina relative to the non-disaster time period. The incidence of post-disaster crime, particularly looting, is much less than what is believed by residents and the media (Birkland 1998). However, with respect to crime statistics, there are limitations, since the disasters may negatively impact the record keeping system. This must be taken into account when viewing the crime statistics for the time period immediately following a disaster (Barsky 2006). Further, the lack of a uniform agreement on the distinction between looting and appropriating behavior allows police officers to use discretion when deciding whom to arrest. There are instances where some police officers would turn a blind eye to the looting, while others would make an arrest. Thus, this use of discretion leads to inconsistencies in the official crime statistics.

This is not to say the no looting occurred, but rather to suggest that it was not widespread. In explaining the instance of actual looting additional explanatory factors can be presented. According to the 2000 Census, 27.9 percent of New Orleans residents were living below the
poverty line in 1999 compared to 12.4 percent of the total U.S. population. In fact, 21 percent of the New Orleans population reportedly made less than $10,000 per year in 1999 (Census 2000). In areas where poverty and inequality are issues impacting everyday life, "natural disasters sometimes seem to offer a “once-in-a-lifetime opportunity” for attacking the party in power while it is distracted" (Stallings 1988), p571. In these types of circumstances, such as in St. Croix after Hurricane Hugo (Quarantelli 1994a), looting patterns similar to those seen in civil disturbances may take place. A New Orleans law enforcement official emphasized this point when he stated that instances of civil unrest were beginning to occur in New Orleans in the days following Hurricane Katrina: "You could see civil unrest taking place before our eyes, especially around the Superdome." Examples of looting and civil unrest in the area were attributed to the lack of provision of essential services. For example, the New Orleans law enforcement official recounted situations in which citizens took water trucks from the local water plant and drove them around to give out water. They felt that their basic need of access to clean drinking water was not being met. So, they took matters into their own hands and seemed more prone than others to engage in collective action against the authorities.

In addition to reports about looting, other stories about various forms of exploitative behavior also are likely to be circulated. Stories of persons taking economic advantage of disaster victims by selling ice or food at inflated prices are often common during the emergency period. We would not deny that isolated examples of such behavior may occur any more than we would deny that similar forms of even more subtle economic exploitation occur every day in non-impact American communities. Actually, the emergency period is a situation where "normal" anti-social behavior is greatly reduced and various forms of altruistic behavior greatly increased. Possessions are shared. Food, clothing, shelter is given to those who need them; labor is contributed. In many disasters, we continually find informal groups of persons who work for days together to help others, not just others they know, but simply others who need help.

Disaster Morale

Again contrary to the popular image, morale in disaster-impacted communities is not typically destroyed. Non-victims almost always outnumber victims. Even in a community with a large number of victims, losses do not typically have a cumulative effect in lowering morale. Individual suffering is always experienced in reference to the plight of others and since suffering
in the disaster context happens to multiple people it is not typically an isolating experience. Even
the victims have to judge themselves in terms of what happened to others. Except death, there are
always others who are worse off. Too, the various deprivations within the community have not
been caused by the victims themselves but have been "caused" by outside forces. Each victim
becomes a small part of a larger community of sufferers where they often see themselves as able
to “do good.” For victims, their collective needs are typically seen as having an obvious and
immediate solution clear enough that any action will result in a pay-off. Thus, disasters provide
extensive opportunities for participation in activities which are for the good of the community.
Also, this kind of involvement and participation are carried out under conditions that give a
person great latitude or choice in the determination of what and how things should be done. This
is often in contrast to the restrictiveness and repetitiveness of the jobs of many of the persons in
their pre-impact occupations. In the disaster context, the premium is placed on adaptation and
innovation. And underlying these activities are a set of common values toward which individual
and collective action can be directed. The possibility for such direct action toward important
values is in contrast to the ambiguity and even the meaningless of existence of many of the
community members, before impact. A person can see his own contribution to the "good" of the
community. In pre-disaster times, these are difficult to come by. It is unsurprising therefore, that
one of the consequences of a disaster is of a positive rather than negative nature.

Mental Health

The literature related to the mental health effects of disasters is extensive. Over the last
four decades considerable effort has been focused on this issue. More than any of the other areas,
there are high degrees of both consensus and disagreement among these studies. In terms of
disagreement, although not always clear-cut, the main divisions tend to be between
psychologically/clinically-oriented researchers and sociologically-oriented researchers.
Methodological differences account for much of the remaining variation. This summary is
intended to provide a succinct discussion of this research based mostly on works that have
reviewed empirical studies.

Psychologically oriented researchers have a greater tendency to characterize disasters as
having negative mental health effects; are more likely to see mental health problems as relatively
widespread and severe following disasters; and typically argue that disasters have lasting
negative mental health effects even months and years after a disaster’s occurrence. They also tend to conceptualize disasters as events that are capable of producing individual trauma—that is, are similar to other traumatic events like exposure to violence, combat or extreme life threatening experiences—and to look for and find evidence of post-traumatic stress in disaster victims. They generally prefer to focus on symptoms and identifiable disorders, as opposed to more generalized psychological distress or problematic behaviors people may exhibit, such as higher rates of drinking, other substance abuse, or interpersonal violence.

Sociologically-oriented researchers tend to characterize disasters as having the potential for creating both negative and positive mental health outcomes, to argue that when mental health problems do develop following disasters, they are comparatively rare and mild; they tend to see problems as transient; and believe that generally not extending beyond a few weeks or months after the disaster event. They also are more prone to identify the mismanagement by agencies and organizations rather than the effects of the disaster itself as the main source of difficulties victims face. In trying to understand how disasters lead to negative psychosocial outcomes, sociologically oriented researchers focus attention equally on the traumas to which victims may be exposed during disaster events and on the contributions made by the broader social context, including social-structural and community-level factors.

In addition to disciplinary differences, there are significant methodological discrepancies as well. The most important of these include the following:

1. Studies differ widely in what they define as disasters.
2. Studies differ in how they define disaster victimization.
3. Studies differ in how dependent variables—that is, mental health outcomes—have been measured.
4. Most studies lack baseline mental health data on the populations under study.
5. Many studies use small, non-representative, non-random samples.

In many cases there is a failure to introduce appropriate control populations, both in the form of non- or less-exposed control groups and in the form of appropriate control variables in statistical analyses.
Even given these issues, it is possible to make some sense of the conclusions derived by researchers and practitioners using these different approaches. First, it is important to recognize that no one disputes that disaster victims experience real pain and suffering, or the fact that disasters can be deeply distressing for those who experience them. Instead, scholarly debates have centered on the extent to which disasters produce identifiable mental health problems in victim populations, and if they do, what it is about disasters that produce those effects and what factors are important predictors of post-disaster psychological outcomes. Each of these issues is discussed below.

To what extent do disasters produce identifiable mental health problems in victim populations? For the most part, the major distinction between psychological and sociological interpretations of mental health impacts post disaster are not related to the behaviors observed, but rather to the ultimate conclusions one draws from those observations. The psychological perspective on disaster mental health issues is best illustrated by the work of Norris et al (Norris et al. 1999), suggests that almost all studies that have examined the outcomes of adult residents 3 to 12 months after a community disaster have documented substantial psychological morbidity in the form of PTSD, Anxiety, depression, sleep disorder, or psychosomatic complaints. Sociologists tend to agree that many surface psychological reactions such as sleeplessness, loss of appetite, anxiety and irritability occur as well. The difference however comes in the interpretation of these symptoms. Sociologists tend to suggest that these are subclinical, short lived and self-remitting. Psychologists tend to see the same symptoms as indicators of mental health morbidity in need of intervention. Despite the discrepancy in interpreting the meaning of these symptoms in the initial time period both perspective agree that findings indicate that the long-term affects peak in the first year and become less prevalent after that time, with only a minority of victims being substantially impaired in the long term.

What factors are important predictors of long-term post-disaster psychological outcomes? Even though there is disagreement regarding the conclusions that should be drawn regarding the severity of mental health issues in general, most agree that other issues must also be taken into account in order to determine the extent of negative consequences (Tierney 2000)and the degree to which one’s condition will improve or worsen (Norris et al. 1999). The most important factors include social structural indicators such as: socioeconomic status, ethnicity, social networks, the
presence of secondary stressors, and the success of organizational intervention. Each is discussed below.

Episodic stressful events, including disasters, must be seen against the backdrop of the ongoing stressful circumstances that people experience throughout their lives. Disaster impacts cannot be analyzed in isolation from broader social patterns. Disasters are experienced by individuals who by virtue of their social positions, socially-structured life experiences, and coping capacities, are already differentially vulnerable to psychosocial stress. These chronic or systemic sources of stress are thought to account at least in part for the inverse relationship that exists between socioeconomic status and both poor health and psychological distress, a finding that is among the most robust in the research literature. According to a vast array of studies, it is both physically and psychologically damaging to be on the lower rungs of the status ladder.

A disaster's impact on the physical environment and the community may be so devastating that social support networks fail to function and the recovery period is lengthy and difficult, causing disaster-related stresses to be amplified. As suggested in a number of other contexts, social embeddedness and perceived support are key to understanding mental health outcomes (Tierney 2000). It is also evident that in addition to being stressful in and of themselves--that is, in addition to acting as primary stressors--disasters also produce other secondary stressors, such as job loss, forced relocation, and economic hardship and uncertainty. Many discuss these in terms of resource loss or capital loss. The basic premise is that the short term losses from disasters may lead to “a spiral of losses (Norris et al. 1999).” It is not simply the initial hit, but also the continually worsening conditions that are important for determining mental health effects.

The organized attempt to respond to the occasion can also be a contributing factor. In other words, the source of many common and widespread, although relatively unimportant, post-disaster behavioral and psychological difficulties is the social setting in which post-disaster relief and recovery services are obtained. Efforts to obtain services frequently generate anger, concern, worry, and anxiety; they are what some have called "secondary disasters" which are "produced by the socially organized response and in particular inequities in the distribution process."
What should be done? If the negative effects of chronic and acute stressors are cumulative (and research suggests that they are), then it is reasonable to assume that, other things being equal, individuals and groups that have already been exposed to high levels of socially-induced stress will find coping with disasters and the problems they engender even more difficult. The following should be seen as key risk factors in the design of mental health interventions.

1. Experience a catastrophic or near-catastrophic disaster event--that is a disaster that produces widespread death and destruction and intense feelings of fear and threat;
2. Experience high levels of personal loss, including the loss of loved ones and personal injury.
3. Loss of physical possessions and loss of other sources of social attachment and integration, such as a place of residence or neighborhood.
4. Experience disaster events that so disrupt the physical environment and community systems that household and community recovery are long and protracted, adding to feelings of stress over a prolonged period.
5. Experience on an ongoing basis the disadvantages associated with lower social class status or ethnic group membership;
6. Lack effective social support networks, or find that those networks are so compromised by disaster that they don't perform their usual stress-buffering functions;
7. Lack the psychological resiliency, positive psychological traits, and intra-psychic coping skills that typically afford protection against stressful life events

These observations are meant to suggest that in considering strategies for mental health program development and intervention, the highest priority should be given to disaster victims who are already subject to high levels of chronic and acute stress, who had already been manifesting symptoms of psychological disorder prior to disaster victimization, who are already having difficulty coping on a daily basis. Mental health problems clearly must focus on stress and trauma from the point of view of the individual not the collective. It is important to recognize that decreased mental well-being is not a universal experience. While there may be elevated stressors in the short term it is important fully account for their sources and the confounding variables that generate such experiences. For example, it is important to understand how people respond physiologically, emotionally, and cognitively to the stressful circumstances and traumatic events that accompany disasters; to document the phenomenology of those
experiences; to focus on psychological factors that render people more or less vulnerable to stress; and to learn more about the intra-psychic processes that help them maintain balance under conditions of excessive threat and demand. At the same time, in conceptualizing and analyzing the impact of stress on psychological well-being, both more generally and with respect to disasters, it is equally important to view individuals not in isolation, but rather in context—that is, taking into account such factors as the individual's social location, the socially-structured availability of coping resources, and broader socio-cultural and socioeconomic influences on individual mental health outcomes. In a time of shrinking mental health resources, rather than considering all residents of a disaster-stricken area as potentially in need of mental health services, it makes sense to devise programs that target highly vulnerable segments of the population, as well as areas in stricken communities that have experienced extensive disaster damage and disruption. A holistic perspective on disaster mental health would take into account not only disaster event characteristics, but also social-systemic sources of both acute and chronic stress, secondary and cumulative stressors, and victims' internal and external coping capacities (Tierney 2000)

Why do Disaster Myths Matter?

The inaccuracies of organizational leaders’ perceptions of the beliefs above have real consequences. As a result of these generalized beliefs, officials engage in and/or avoid a number of activities based on a misinformed perspective on how people react during emergencies and disasters. Among other ill advised activities, officials: are often reticent to give warnings, fearing they will unintentionally cause mass panic and irrational behaviors; assume that unsolicited massive amounts of helping behavior and material resources from outside agencies are needed, since people cannot care for themselves; believe that they have to mobilize large number of staff, since there will be a major problem caused by role abandonment, crippling local organizations’ ability to function during the emergency, with personnel not showing to work to take care of their families; act as if that there will be a need to increase the allocation of resources for security and the involvement of the military and the use of martial law and curfews. Since the local community is presumably overwhelmed, officials often believe these security forces should be drawn from the military. In addition, since they often assume community leadership has collapsed, they see a need for strong military leaders to take over the affairs of disaster recovery,
reconstruction, and recovery of the community. Disasters are dramatic events in the life of any community. They become important in the collective memories of communities and become major reference points by which other events are compared and rated. Since disasters are such public events, those who have shared in them are brought together by their common experience. They now possess something that "outsiders can never know and understand. In fact, this heightened morale within the community has unanticipated consequences. It tends to condition the relationships between the "insiders", those members of the community who have shared the experience, and the "outsiders", those persons from outside the community who have come to help. This is reflected in part by the low and even negative evaluations which "outside" agencies often receive from the local inhabitants. Regional or national personnel who possess important skills are viewed as impersonal and unsympathetic since they have not shared in the community sufferings. They are seen as cold and insensitive to "local" problems and issues. Morale develops to such an extent that it not only supports and motivates the local inhabitants but it also creates a wall around them to exclude the outsiders, many of whom have relevant skills and resources which might be used. To the locals, it is "their" disaster and they do not want any outsiders coming in to take credit for "their" work during the emergency period.

Furthermore, the members of a disaster-impacted community are seldom as bleak about the future as is sometimes projected on to them by outsiders. For them, their future and that of rebuilding their areas is often seen in more optimistic terms than they are given credit for in most cases. For example, for many evacuees from Katrina the potential to improve their lives through access to high quality education for their children and better housing, health care, and job opportunities in the new communities were very real.

In order to respond properly, organizations must recognize the following: a) In the aftermath of disasters it is common for a large number of individuals and material resources to converge on the disaster site. These resources pose a paradox to professional organizations responding at the scene. While on one hand they can be very useful and valuable to the overall effort at the same time they can also be a hindrance. The latter is true when the resources don’t match the needs (ex. sweaters sent to New Orleans after Katrina) or when the quantity far exceeds demand; b) Local emergency-related organizations generally have enough people and are not rendered ineffective by loss of personnel. Except in the unlikeliest of circumstances,
almost all local organizations usually have more personnel than they can adequately use at any one time. One of their problems in disasters is to try to utilize regular personnel effectively in an un-routine, expanded, continuous operation. Organizations operating on a shift basis can handle this by lengthening shifts rather than putting two shifts on at the same time. Whether on a shift basis or not, it is important that some personnel and especially key officials get enough rest. Unless some prior thought is given to this matter, it can be easily overlooked during the emergency period, with consequent negative consequences for the efficiency of overall emergency operations. Officials who go without sleep for a great number of hours are often too tired to make proper judgments and decisions. Equally as important, because of their lengthy tours of duty, they are unfortunately also likely to become the sole sources of information about the disaster which really should be widely shared among other officials; c) There are times when most emergency organizations will be the recipients of offers of assistance by local volunteers. However, because the quantity and quality of volunteer help is very problematical in any given disaster, it is wise for organizations not to make their possible availability an integral and central part of emergency planning. Even when they appear in large numbers, volunteers can be more trouble than they are worth, especially if there has not been effective pre-planning. It is necessary not only to clarify the nature of the work that volunteers could be assigned to, but also equally as important, it is vital that some regular organizational personnel be given definite responsibility for their use and control. In general, at times of emergencies regular staffs should do the specialized work of the organization, with persons from outside of the group being assigned if possible only to the most routine and standardized of-tasks requiring little supervision or training. Planning needs to take into account the complicated legal and public relations problems the possible appearance of volunteers’ causes for emergency organizations; d) While symbolic security measures have to be taken, massive deployment of security forces is unnecessary. Looting and other anti-social behaviors are very rare in disaster situations. However, because of the myths to the contrary, the presence of security forces is a symbolic necessity that cannot be ignored. However, this symbolic need can probably be met by the conspicuous posting of relatively few armed guards at certain strategic and visible locations, and by official announcements through the mass media that all necessary security measures are being taken, rather than through the massive deployment of security personnel all over the impacted area. The belief that security is necessary can be countered by creating the belief that security is being
undertaken. The usually available security personnel in an area can be used far more usefully in
the important task of managing and controlling the convergence of people and materials on a
disaster site. They will have different motives -- many are seeking friends and relatives, some are
persons who live in the area and are returning, a few are just curious, others have come to help in
any way they can; seldom there are there for exploitative purposes. Traffic control is far more of
a problem. Whatever their individual motives, their converging does create a collective problem,
and considerable attention in planning needs to be given to problems of keeping evacuation and
supply routes open and operating; e) Community morale is generally high immediately after a
disaster, so the population does not need visits by important public officials to allay anxieties.
For a variety of reasons, persons in a disaster-stricken community tend to have a rather high
morale. For those who need reassurance, friends and relatives are the best sources of support and
this will be operative regardless of public policy. Quick restoration of public utilities, clearing of
roads and debris, regular scheduling of bus service, reopening of stores, etc., will serve to
maintain morale far more than vague statements from public officials about community spirit
and the like. Planning should be directed at bringing about as quickly as possible as much
normality of general community services and facilities as can be achieved, if the maintenance of
high morale is desired. However, there is a need to recognize that persons from outside the
community such as state legislators, governors, congressmen, senators, cabinet officers and even
presidents sometimes feel their presence on the scene will contribute to local morale, although
there is little evidence for such an idea. Pre-disaster planning should allocate personnel to serve
as tour guides for such visitors because public relations and political considerations dictate they
should not be barred from visiting a stricken area. Local officials who play reassuring roles
might serve in this capacity rather than persons involved in key relief and rehabilitation activities;
f) Coordination is more crucial than strong leadership at times of disasters, but this should not be
directed or controlled from outside the stricken area. Disasters do not create total social chaos.
Thus, there is no need for the imposition of strong controls or dictatorial directions. What is
generally necessary instead is organization of all the various involved groups dealing with a
range of different emergency problems. This requires the development of coordination among
them. One important element of such planning is the assignment of responsibility to some key
emergency organization to call a meeting of all involved parties not more than several hours after
impact. The purpose of the meeting is to share knowledge and intelligence about the
consequences of the disaster, and to ascertain who is doing what and where in the emergency period. Some local group should do the calling of such a meeting; g) There are some disaster-generated needs that have to be responded to quickly and immediately such as search and rescue, emergency medical care, and the neutralizing of secondary threats (e.g., downed electric wires after a tornado or hurricane). But for most other requirements in relief and rehabilitation, immediate action is generally not necessary. In fact, it is more important in the early stages after impact to collect information as to what is needed than to attempt to start a massive flow of indiscriminate aid into the stricken community. Needs as to food, clothing, shelter, medical teams and mobile hospitals, especially, are usually lower than first believed and only fairly selected items are generally needed. Local direction of aid is crucial to insure that the help that is sent is what is needed rather than what outsiders assume should be required in a disaster; h) The research evidence seems to suggest the tremendous resilience of individuals, groups and communities under conditions of adversity and their rather amazing capacity to cope and innovate. By discounting these myths, we are not saying there are no major problems in disaster. There are some very serious ones for which emergency planning and organization is necessary. What we are saying is that what are commonly believed to be the major problems in disaster are often not the actual ones. Unfortunately, there are always people who sometimes think that vivid anecdotes about isolated cases of looting, personal disorganization, the failure of local officials, the breakdown of community emergency activities, the needed use of mass shelters, etc. provide the basis for planning. While such anecdotes may in fact be based on actual cases, they would only represent the atypical, the unlikely rather than the typical, expectable behavior. The typical, expectable behavior is the base on which planning has to be constructed.
Social Science Insights on Planning

Before our discussion of some of the actual behavioral patterns in disasters, we noted certain false planning assumptions that could be derived from misconceptions of disaster responses. It is perhaps useful to suggest a more realistic set of implications for emergency planning. However, such implications cannot ignore the prevalence of the false images. The fact that the myths are so widespread and believed creates a set of problems which in certain ways is as important as the demands which are created by the disaster impact itself. Planning has to assume that the myths themselves have to be taken into account as one factor operative in emergencies. Several suggestions can be made here, some of which are perhaps as applicable to disaster operations as they are to disaster pre-planning.

Open Communication

Information about dangers should be disseminated and not withheld because of a fear that people will panic. Individuals can deal with the truth of certain dangers more adequately than they can deal with misinformation which is later contradicted by experience. Persons in areas threatened by disaster impact should be informed as to the realistic probabilities of impact. The major problem is not that people will act irrationally on the basis of that information; a more important problem is to get them to act at all. It is difficult to convince persons of abstract threats. Thus, it is best to translate a general warning into a set of personal probabilities. For example, to say that winds will reach 85 miles per hour is meaningless unless the fact is known that an 85-mile-per-hour wind can blow trees down and roofs off. It is better to report that the water will reach the steps of the city hall or some other familiar location than to say that the flood stage will reach 59.9 feet. Warnings should also be translated into personal alternatives for action. Given the probabilities of certain threats -- windows should be taped up; certain specific areas should be evacuated; particular evacuation routes should be taken; and certain kinds of assistance are available from clearly designated sources. If warnings are to become inputs for individual decision-making it is necessary that they be relatively concrete in specifying the nature of the threat as well as the protective actions that can be taken.
The Interface between Disasters and Social Systems

Patterns of leadership and of authority in disaster-impacted communities are very complex. Their complexity, however, is usually misinterpreted as confusion and loss of "strong leadership" is frequently offered as an explanation without understanding the nature of the problem. Perhaps the beginning of understanding is to start with the observation that almost all communities are not organized to cope with disasters. This is true even in localities with extensive pre-disaster planning since there is a considerable difference in anticipating problems and facing them. What disasters do is to create a series of new problems for the community and in doing this they necessitate new relationships among its parts. Disasters force the development of a new structure that includes various parts of the community that make decisions "for" the community. What happens in the early stages of a disaster emergency is that the pre-disaster community structure has to be modified in the face of new and complex problems for which this previous structure does not fit. New tasks are created by disaster impact that no existing local organization has as its responsibility. Therefore, new social forms have to be created and new relationships forged. The magnitude of these tasks necessitates 'unusual" new arrangements between traditional community organizations, outside agencies, volunteers and many other groups not previously involved together in any pre-disaster situation. In addition, most of these new tasks are created at roughly the same time so that activity is going on simultaneously, not consecutively. At the same time, the accomplishment of some tasks is clearly dependent on the achievement of others, i.e., roads have to be cleared before persons can be taken to hospitals, etc. The pre-disaster pattern of community organization is not adequate to confront these problems since it was based on a different set of problems, less complex involvement, a more traditional division of labor, more segmentalized, autonomous action, and a leisurely pace in resolving conflicting claims. As a consequence, a new community structure has to be developed to cope with the new problems. The key word here is "developed". Particularly “outsiders” who have no previous community authority cannot impose it. Nor can insiders, since what was the pre-disaster authority structure is now more diffuse and more widely shared among the various participating segments within the community. It is clearly impossible for any one person to collect and to monopolize authority. Authority by definition has to be given to those who possess it by those who accept it. The scope and complexity of involvement in disaster undercuts the possibilities of centralizing authority to a much greater extent than these possibilities exist even in the pre-
disaster patterns of American communities. The interdependence of those who become involved does lead, however, to the emergence of a cooperative decision-making mechanism, which facilitates cooperation among the many parts and which, resolves conflicts which emerge. Such mechanisms look untidy to those who have an expectation for a neat model of bureaucratic efficiency or as undependable to those who have little faith in the capacity of members of a community to cope with adversity. What usually emerges is a very informal brokerage system among those who have a stake in disaster operations. Such a structure involves many different people -- municipal officials, representatives of private organizations, knowledgeable and involved persons, etc. In other words, it includes those who represent the various bases of authority which exist in fact within the community. The result is not chaos or confusion but a realistic outcome of the involvement and resources of many segments of the community coming together in the accomplishment of common tasks. This outcome is never created based on unrealistic notions of "controlling and commanding" the situation. Authority has to be earned, not imposed, and those who wish to impose it will seldom earn it. It is had by those whose performance shows that they deserve it, and it seldom comes to those who just claim it.

**Formal Organizations, Victim responders, and Volunteers**

It should be assumed that persons in disaster-impacted areas actively respond to the emergency and will not wait for community officials to tell them what to do. People are not immobilized by impact. They are "out there" working. In the emergency period they will be digging persons out of debris, hurrying others off to medical care, hunting for victims, getting temporary shelter and food, etc. What victims and nearby persons cannot do during the emergency period are those things that require specialized equipment or especially skilled personnel. Thus, the need is not to provide an immediate, indiscriminate across-the-board flood of aid, but rather to insure that certain selected items and people can always be readily located and mobilized. It is the rare natural disaster, for instance, that does not require earth moving and digging equipment and certain kinds of medical personnel such as surgeons. Thought has to be given also to the probabilities that there might be particular hazards in certain localities that might necessitate, say, specialists in burn cases or numerous boats for water transportation. Good pre-planning requires the making of inventories of key items and people likely to be needed and a specification of procedures for their quick location and mobilization at times of emergencies.
More important for most response organizations will be dealing with the issues rated to convergence. Convergence patterns characterize post disaster situations. Much of what happens after first responders start to work, and their initial definition of the situation, can be visualized as convergence and outflow patterns taking place among the location or places where the disaster takes place, a boundary region where resources and personnel is positioned, and an outward region which constitutes the broader social context from which resources emanate. Each of these three regions has their own and distinctive set of activities and processes related to the incident. There is a movement of people, organizations, things, and information outward from the disaster site, and a similar flow toward it. Both the outflow and the convergence patterns are marked by much uncertainty and unevenness of knowledge of the situation by selectively involved organizations. What flows out is even more erratic than what converges, and some behaviors tend to compound the difficulties in the situation and almost ensure lack of coordination. There are also special problems with respect to exactly how to handle the often overwhelming numbers of mass media representatives, how to obtain accurate information relevant to the diagnosis and treatment of victims, and how to identify the appropriate procedures. Roughly the same situation prevails in the relief and rehabilitation period as during the emergency period. That is, victims will not simply be waiting to be assisted -- they will be actively seeking housing, clothing and other supplies, jobs and sources of remuneration. It is best to assume that almost all persons in a disaster area are taking some initiative in the context of convergence and outflow, with the problem being-how to direct more organized efforts at rehabilitation so they will mesh with individual initiatives.

The term ‘mass assault’ was suggested by Barton to describe this initial response (Dynes, Marche and Pelanda 1987). Understanding the mass assault can provide important information about how people are likely to respond. According to Fritz and Mathewson (Fritz and Mathewson 1957) there are two types of convergence in the aftermath of a disaster: external convergence and internal convergence. External convergence is defined as movement towards the disaster struck area from outside; internal convergence is defined as movement towards specific points within a given disaster related area or zone. There are also major forms of convergence: personal convergence, informational convergence, material convergence. Personal convergence is the actual physical movement of persons on foot, by auto or other vehicle. Informational convergence is the movement of transmission of messages. Material convergence
is the physical movement of supplies and equipment. Personal convergence is the most important for this effort. It is important to note the differences between helpers who range from professional, technically trained formal emergency responders, to the partially trained, to untrained but well meaning individuals. ‘Personal convergers’ have a range of motivations for coming to the area and a useful five-part typology of personal convergers was developed almost half a century ago (Fritz and Mathewson 1957). The first type, returnees, consists of people who live in the disaster-affected area but have been evacuated. The second type is the anxious, people from outside the community who come to the affected area in order to find information about family members or friends. The third type, the curious, consists of people who come to the disaster site mainly to view the destruction. The fourth type is the exploiter—people who attempt to use the disaster for their own personal gain or profit. The fifth and final type are helpers, that is, people who come from both inside and outside local jurisdictions in order to help victims or other responders. (Wachtendorf and Kendra 2004) further updated this typology after the 9-11 attacks to include fans or supporters.

Formal responders are usually afforded more influence and control than others at the site of disasters, and they can often choose to include or exclude others from the site. Unaffiliated volunteers present many challenges during disaster response because their desire to help does not often coincide with their ability to be integrated into the response setting (Kendra and Wachtendorf 2001). Because such volunteers are not associated with a formal organization responding to the disaster, they often find it difficult to participate in the response. The use or non-use of helpers is a function of a power dynamic between mandated or official individual/organizational emergency response entities and those seen as unofficial volunteers. This power effect increases as the hours after impact pass and control over the site is re-established by the authorities responding to disasters. While there is no one correct answer on how best to make use of volunteers in a disaster response it is important that plans recognize that convergence will happen and that it should be planned for. There are some strategies than can be employed. First, it is important to identify the reason a person has converged on the area. Given the variety of motivations, there at least an equal number of appropriate responses as there are types of convergers. Second, recognize the utility of such convergers. Assign roles to volunteers that allow them to help without harming himself or herself or anyone else involved in the response. These tasks should be pre-identified and those responsible for operations should be
made aware of them. Another strategy might be to determine criteria for the assessment of volunteers so they can be placed in a role that will utilize their skills (Barsky et al. 2007). Finally, when their activities are not in direct conflict with the goals of the response it is important to simply allow convergers to go about their business. What to do with volunteers is a still a largely unresolved issue in the management of emergencies. It is an issue that will not go away and that should not be treated as a nuisance. The utilization of volunteers constitutes an opportunity and should be considered by those attempting to plan for complex emergencies and disasters.

Emergency Planning Approaches

It is important to take into account the many suggestions researchers have made about planning for disasters. It is vital that planning takes into account a number of important principles of emergency management as discussed in the disaster research field. The following are several key issues:

Begin with “All Hazards” Oriented issues and move towards hazard specific. While different hazards (e.g. hurricane, flood, chemical release, avian flu) will create different needs, planning under the constraints of a real world budget cannot account for every nuance of every possibility of trouble all at once. As a result, it is important to identify high probability events and plan more extensively for these. It is also vital to create a model of response that attends to the many tasks that might be performed in any type of event. You can get more bang-for-the-buck if you spend monies on preparing for potential needs that will be present in multiple types of events.

Community Tailored. While the basic elements of formal emergency plans are fairly similar across communities that have engaged in planning activities, it is important to recognize that these plans are not simply interchangeable. It is extremely important to understand community demographics, resources, and special needs if an emergency plan is to be successful in making responses better. By taking into account the characteristics of the community, we can reduce unknowns and increase the appropriateness and rapidity of disaster response. Further, by understanding more about the community, we can use a long history of disaster research to help
understand both the likely issues that might be faced as well as the strengths that can be utilized during disaster response.

An Integrated Network. Planning is most effective when it is integrated rather than fragmented. Given this reality we need to understand planning as a way of linking together both private and public organizations and people that will likely perform disaster related tasks in the community during a public health emergency. By bringing together these groups we can facilitate the pooling of collective strengths and capacities. In addition, we need to realize that the community is only one of many connected communities in the region, county, and state. As a result, in addition to being in contact and integrated with local stakeholders we will also be focused on integration with external related organizations.

“Living Document.” As Clarke points out in his book *Mission Improbable*, “Some plans are highly instrumental, but others are little more than vague hopes of remote futures with no connection to human will or capacity” (Clarke 1999). This suggestion serves as a powerful warning to all who engage in planning activities. Creating a book, document, or plan is simply the beginning of the process. As suggested by many organizational and disaster specialists true preparedness comes as institutions become more like high reliability systems with a constant reflective capacity. Such systems thrive through constant communication, self-questioning, and adaptation.

Planning and Emergence.

This general theme is as old as the first systematic social science field studies of disasters in the early 1950s. One of the most consistent observations reported by pioneer field researchers was that during the crisis period of disasters, there was a great deal of emergent behavior, both at the individual and group levels. The emergent quality took the form of nontraditional or new behavior, different from routine or customary norm-guided actions. This new behavior was heavily pro-social, helping in coping with the extreme and unusual demands of a disaster situation. But the earliest studies did not go much beyond noting a wide range of emergent features in disaster occasions. The establishment of the DRC at The Ohio State University in 1963, however, led to a more analytical approach to emergent behavior. The DRC quickly developed a typology of organized behaviors at the time of the crisis period in disasters, which
first appeared in a paper (Quarantelli 1966) and later in a book (Dynes 1970). Basically, the model states that organized behavior can involve either regular or non-regular tasks and that the structures to carry out these tasks can either exist before a disaster or come into being after impact. A cross-tabulation of these dimensions produces four types of groups: (1) established groups, *regular tasks and old structures*; (2) expanding groups, *regular tasks and new structures*; (3) extending groups, *nonregular tasks and old structures*; and (4) emergent groups, *new tasks and new structures*. In the 1970s, this typology was subject to modifications by scholars both within and outside the DRC. For example, (Bardo 1978) extended the typology and Quarantelli (Quarantelli 1984) attempted to distinguish between emergent behaviors and emergent groups, which resulted in the addition of three new types. Another major step forward occurred in 1987 when Drabek wrote what is still the most extensive theoretical discussion on the topic.

Reviewing the existing research, including studies outside of the DRC e.g., (Zurcher 1968); (Walsh 1981), he asked such questions as What is emergence and what emerges? And what are the conditions that lead to emergence? Answers to these questions suggest weaknesses in the traditional DRC typology and later variants.

Almost two decades later, Wachtendorf (Wachtendorf 2004), using data from her field studies focusing on the organizational response to the 9/11 terrorist attacks in New York City, developed the most sophisticated approach yet. She substituted the term *improvisation* for emergence and indicated three different types of improvisation (which she called reproductive, adaptive, and creative). She also gave some indication of what conditions generate each type. All of this research highlights the need to balance planning with adaptive capacity or allowing for the occurrence of emergence in planning. Public health officials should strive to create systems that attempt to predict and plan for disasters, but also give ample opportunity for responders, organizations, institution, and networks to flex as necessary. It is not a matter of planning against emergence, but planning and emergence.

The disaster literature has long emphasized the need to plan for unexpected events (Dynes and Drabek 1994). Plans constitute institutional knowledge that extends beyond individuals who experienced prior disasters. The planning process is designed to imagine disaster scenarios not previously anticipated, foster the development of informal networks, and facilitate interagency coordination (Wachtendorf 2000);(Wachtendorf 2004); (Gillespie 1991); (Auf der
Heide 1989). For the most part, social systems and the units that comprise them are effective in responding to disasters; however, their response can be enhanced with proper planning and the development of social mechanisms to coordinate inter-organizational activities. When pre-planning does occur, the capabilities of the involved organizations are enhanced (Dynes & Drabek, 1994). At the same time however, the very definition of a disaster implies that community resources are stressed or overwhelmed. It is common for new social arrangements to emerge in disaster situations that are tightly coupled to previously existing arrangements (Rodriguez, Trainor and Quarantelli 2006); (Wachtendorf and Kendra 2004); Kreps & Bosworth, 1993; Quarantelli & Dynes, 1977). At the same time, the very need for improvised action points to the inability of plans to adequately take into account one or more specific demands, sometimes quite understandably so, since it is not practical or feasible to plan fully for every possible scenario (Wachtendorf and Kendra 2004). Plans that claim to account for every contingency that disasters may present become “fantasy documents;” that is, documents that serve to show that planning has been done to contend with improbably events rather that necessarily providing justifiable assurance that the plan can fully anticipate every challenge that a disaster would pose (Clarke 1999). Existing social arrangements are always subject to change (Kreps and Bosworth 1993), particularly when coupled with the ambiguity and confusion that often accompanies large-scale disasters (Webb 1998). As Kreps (Kreps 1991) p33 observes: without improvisation, emergency management loses flexibility in the face of changing conditions. Without preparedness, emergency management loses clarity and efficiency in meeting essential disaster-related demands.

Equally important, improvisation and preparedness go hand in hand. Preparedness does not decrease the ability to improvise. On the contrary, even a modest effort to prepare enhances the ability to improvise. In a disaster, improvisation must take place under increased time constraints and in environments that have a high degree of ambiguity. Improvising can be risky. At times, the improvised action is beneficial; in other cases, the improvised action may have negative consequences. Failure to improvise when situations require novel action carries major risks. Weick’s study of the Mann Gulch Fire to show that during a crisis, emergency response organizations are often likely to return to original plans when they actually need to improvise (Weick 1993). In the Mann Gulch Fire disaster, teams forced their conception of the emergency to fit one that they knew and had planned for instead of the one they were facing. At the same
time, abandoning plans or established courses of action in favor of untested strategies could lead to consequences much more dangerous and damaging than those that would have occurred were pre-established strategies implemented. When, then, is it best to persist with existing plans, and when is improvisation the best course of action? Quarantelli (Quarantelli 1996) suggested several conditions that influence emergent action, including the perception of a need to act on urgent matters, a supportive social climate for collective action, relevant pre-crisis relationships, and access to resources. Plans may be abandoned for various reasons: the plans may no longer be applicable (Turner 1995); plans may need to accommodate many organizations involved in a larger emergency response organization due to the multifaceted nature of an event (Mendonca 2001); allocation of resources for one task may render them unavailable for other tasks (Turner 1995); and responsibility for dealing with the unexpected circumstances may not have been assigned to a particular organization (Scanlon 1994). It is clear that both rigidly adhering to a plan that is not appropriate and deviating from the plan when it is better to follow it can generate negative consequences (Klein 1993).

David Neal has explored the conditions that facilitate the occurrence of social and cultural emergence in disasters. He hypothesizes and finds some evidence that the higher the probability of a visible severe impact pertaining to loss of life and damage to property, the more likely emergent groups will come into being. Emergence is also facilitated by: Social conflict in the impacted communities, both in the pre and post disaster periods; In situations in which local disaster organizations (such as the Civil Defense, Red Cross) are not well regarded; The unwillingness of local organizations and government agencies to recognize the threat; The greater the unmet needs of (potential) disaster areas; The closer an area is to the impact zone; The greater the ambivalence and uncertainty of the situation; and the stronger the ties are among pre-existing social networks in an area.

As Dynes and Drabek argue (1994), it is incorrect to view the maintenance of social order and control of the public as the main objectives of disaster planning. Instead, such planning should be oriented toward enhancing the human and material resources of the organizations and groups involved in the event – including their ability to improvise when they believe circumstances warrant such action. Disaster planning may stifle improvisation, but it can also anticipate and incorporate improvisation (Quarantelli, 1996). Distinguishing the types of
improvisation and their facilitators and impediments, which is the goal of this analysis, can not only aid in the emergency management planning process, but under the proper circumstances is can also lead to a better understanding of improvisation as a sociological concept. Sociologists have long studied emergent behavior. A specialization within the field of sociology is called “collective behavior.” This area of study, existing for nearly a century (Park and Burgess 1921), focuses on dynamic social phenomena such as crowds, riots, fads and fashion, panic, revolutions, origins of cults, ephemeral mass actions, and changes in public opinion, among others. The common element in all the behaviors mentioned is that they are primarily of a nontraditional nature and generally arise because the standard ways of acting cannot be followed or are not appropriate for certain occasions. This new behavior was heavily pro-social, helping immensely in coping with the extreme and unusual demands of a disaster situation.

Social Inequality/ Public Health Disparities

The development of the social stratification perspective in disaster dates back to Bates and colleagues (1963) who found that working class individuals in Hurricane Audrey suffered disproportionately greater loss than those of the middle or upper class in disasters. These findings were supported in subsequent disasters and extended to include stratification along racial, ethnic, political power, gender lines as well as illustrating how disaster exacerbates pre-existing inequality (Barnshaw 2005; Bolin and Bolton 1986; Cochrane 1975; Killian, Peacock and Bates 1983; Oliver-Smith 1986; 1989; Peacock and Bates 1982). In reviewing the disaster inequality literature it is important to recognize that although issues of stratification and inequality have been raised within the disaster context, it has only been within the past decade that these issues have been treated more systematically with a greater focus on understanding the impact of disaster events on the larger ecological and social structures (Peacock, Morrow and Gladwin 1997). Similarly, Wisner and colleagues (2003) have argued that disaster is a product of social, political and economic environments that are distinct from the natural environment. More recently, Klinenberg (Klinenberg 2002) used a social autopsy approach in order to illustrate how a disproportionate number of heat wave victims were elderly working class African Americans. In essence, demonstrating how Chicago’s social structure created a stratified distribution of victims along race, class, gender and age lines.
While public health research rarely overlaps with disaster and catastrophe, there are several key insights that are both theoretically and substantively applicable to risk reduction and prevention. Specifically, the public health literature has previously identified high-risk groups in need of public health intervention and provided a framework for transmitting risk reduction messages. As individuals age across the life course, a variety of bio-psychosocial and cultural factors intersect to influence their health and access to public health prevention messages. As the human body ages, bio-psychosocial changes take place which place an individual at increased risk for arthritis, hypertension, heart disease, cataracts, orthopedic impairments, cancer, diabetes, osteoporosis and Alzheimer’s disease (American Psychiatric Association 2000; Carson, Butcher and Mineka 1998; Cockerham 1997; 2001; Finch 1990; Ikels and Beall 2001; Kail and Cavanaugh 2000; Masi and Bilezikian 1997; Martini 1998; Martini, Bartholomew and Welch 2000; National Center for Health Statistics 2004; Quadagno 2002; Solomon 1999; Weiss and Lonnquist 1997). In addition, anatomical and physiological changes take place in both men and women at the cellular, tissue and organ level which have differential effects on the quality of life and well being of those midlife and older (Carson et al. 1998; Cockerham 2001; Gray [1901] 1995; Ikels and Beall 2001; Martini 1998; Martini et al. 2000). Although there is research to conclude that those midlife and older may resist the symptom expression less effectively than younger individuals due to co-morbidity, there is some research to indicate that older individuals better adhere to treatment medications better than younger individuals (Crystal et al. 2003; Kendig and Adler 1990; Wenger et al. 1999). Research on prevention found that although those midlife and older generally have diminished auditory, cognitive and visual acuity and may require larger print messages, greater amplification, frequent summarization and restatement of prevention messages, the messages if properly understood, are more likely to result in behavioral change than among younger adults, particularly when older adults understand the benefits (Bausell 1986; Belloc and Breslow 1972; Levanthal and Prohaska 1986; Linsk 1994; 2000; Nichols et al. 2002; Puleo 1996). The need for increased public health prevention messages highlights the critical importance of understanding the social support and social networks of those midlife and older and their potential role in the transmission of such prevention messages.

In addition to bio-psychosocial factors, structural factors such as financial resources may further inhibit aging groups from receiving the necessary prevention messages. Since the current United States tax structure allows citizens to amass great fortunes as people age, and pass this
wealth inter-generationally, those in the upper socioeconomic strata are largely insulated from non-communicable epidemics due to financial and social resources (Atchley 2000; Bourdieu [1992] 2002; Danziger and Haveman 2001; Grusky 2001; Kerbo 2003). Even when members of the upper class do become infected, they have substantial social resources to maintain a high level of privacy, which often prevents public disclosure, and the financial resources to afford the best medications, which may cost thousands of dollars annually (Barnett and Whiteside 2002; Kopp 2002; Nichols et al. 2002; Stine 2005; Usdin 2003). In sharp contrast, midlife and older working class members, who often work a lifetime in poverty, are often the most at risk for infection, and often experience the highest rates of poor health and living conditions, are more likely to be disabled and least likely to have adequate access to healthcare services for potential diagnosis, or treatment or able to afford expensive medications (Atchley 2000; National Center for Health Statistics 2004; Nichols et al. 2002; Parsons and Halkitis 2002; Usdin 2003). In addition to higher rates of morbidity and lower life expectancies, members of the working class are more likely to engage in reported drug use, which can be a confounding factor in morbidity, medication adherence and treatment (Kwiatowski and Booth 2003; National Center for Health Statistics 2004; Parsons and Halkitis 2002; Parsons et al. 2003; Paul et al. 2001; Schensul et al. 2003; Stall et al. 2001; Stine 2005; Wilson 1987). Although midlife and older working class members often have limited or fixed financial resources this does not mean that they do not recognize that they are at risk for disease. Socioeconomic status provides a unique framework for the exploration of intersections between age, class and morbidity

Resiliency

Resilience focuses our attention on near-term reactions to imminent (or occurring) threats. Resilience deals principally with: rapid systemic response to immediate problems (e.g., building and infrastructural damage or collapse; fire suppression); initiation of immediate relief to affected populations (e.g., provision of shelter, mass care, and medical assistance); and initiation (or creation) of recovery measures (i.e., the return to an acceptable level of functioning for the systems in the effected area) to limit the consequences of damage, death and injury, and economic losses. Resilience is based in the acceptance that communities and systems are capable of drawing on internal resources and competencies to manage the demands, challenges and changes they encounter (Paton & Johnston 2001). Resiliency is a process, not a state. In
order to successfully engage in this process, human systems use their adaptive capacity; that is the capability of the system to adapt while its environment is in flux, is still changing (Gunderson & Holling 2002). Adaptive capacity in human systems is determined by: the ability to learn and retain knowledge; and to engage in creative flexibility in decision making and problem solving. Tierney (2003) argues that for any unit of analysis, four properties are needed to enhance the resiliency process: (1) robustness, the ability to withstand stress and demands without suffering damage, degradation, and loss of function; (2) redundancy, the ability to meet the functional requirements in the event of disruption; (3) resourcefulness, the capacity to identify problems, establish priorities, and mobilize resources to avoid or cope with damage and disruption; and (4) rapidity, the capacity to meet demands in a timely manner.

**Emergency Management vs Network Governance**

It is important to recognize that many of the pandemic and epidemic planning scenarios present these events as “wicked problems” that constantly change and cannot be handled by dividing them into isolated pieces that can be handled by wholly independent organizations (Rittel and Webber 1973). As a result, success during public health emergencies will require partnering with organizations and community groups that are members of the public health system in the broadest terms including: hospitals, EMS providers, local public health departments, not-for-profit organizations such as the American Red Cross, the Salvation Army, Meals on Wheels, visiting nurses associations, religious groups, etc. In short, the effectiveness of any public health system is dependent not on a single organization, but on a set of actors operating in a “governance network” a multi-organizational form that many have suggested has distinct advantages including: increased response capability (Podolney and Page 1998), increased probability that information and resources are exchanged (Powell, Kout and Smith-Doer 1996), and the rise of the laterally distributed knowledge organizations need in rapidly changing environments (Knoke and Guilarte 1995).

This theory of the public health system in many ways represents a non-traditional approach and as a result calls for non-traditional policy solutions focused not on how governmental organizations should operate or how they should “manage” the network response, but on how their policies can guide the development of a more fluid and dynamic coordinated public health governance network. Recognizing this reality is critical as modern research
findings have gone as far as to suggest that the hierarchical dominance of core central governmental agencies no longer works in modern governments and that more co-operative forms of governance are needed (Rhodes 1997). Making such systems work is a task of key importance as more and more public administration and organizational scholars develop deeper respect for the importance of networks, a reality the funding opportunity announcement itself recognizes in the suggestion that: “public health systems are complex network that requires the integration of services from both public and private agencies and organizations.”

It is also important to note that organizational and public policy scholars have long suggested that the processes which make network governance work are significantly different from the traditional management processes that drive organized; governmental actions see (Provan and Kenis 2008) for the most up-to-date form of this argument. If one assumes the latter, policies will be focused on strengthening the centralization of formal systems, forcing predetermined structural forms, and creating a uniform set of assets that will lead to “controlled responses.” The former on the other hand, gives priority to building connections among local actors, better utilizing resources, strengthening and diversify existing capacities, and distributing among a large group of actors, but doing so in manner that provides less opportunity for control by a central authority (Goldsmith and Eggers 2004). Based on these and other findings, we must at a minimum recognize that networks are a distinct social structural form and that facilitating their success may require equally distinct governmental policies and practices (Buck, Trainor and Aguirre 2006). Put in other words, making the shift towards understanding public health service provision as a governance network rather than in simple organizational management terms requires a shift in how we think about the government’s role. We need to ask how public agencies can facilitate coordinated rather than control response. What form should related policies take? Particularly in the case of distributed networks with as many diverse organizations as are found in public health systems and in Emergent Multi-Organizational Response Networks (EMON) (Drabek 1986); (Wachtendorf 2004 ); (Tierney and Trainor 2004); (Trainor 2004) that evolve during responses to disasters and other extreme occasions.

Warning and Response

For more than five decades, researchers have explored the dynamics of warning and response in disaster. Although much of what is known about warning and response is the
product of research in the disaster context, many of the principles developed under warning response have implications for public health preparedness. Within the warning and response research program, four major works (Donner 2007; Lindell and Perry 1992; Mileti and Sorensen 1990; Mileti 1999) have developed an integrated a comprehensive theoretical approach consisting of six major stages.

First, individuals, families, groups, organizations and community actors must understand a warning. As noted previously, there are a variety of factors including age, language and culture which might inhibit actors from understanding and successfully interpreting a warning message (Aguirre 1988; Bausell 1986; Belloc and Breslow 1972; Levanthal and Prohaska 1986; Linsk 1994; 2000; Nichols et al. 2002; Puleo 1996). Consequently, public health officials must make every effort to provide warning messages in formats that are tailored for those midlife and older who have diminished auditory, cognitive and visual acuity and may require larger print messages, greater amplification, frequent summarization and restatement of prevention messages and/or messages in actors native language.

Second, actors must believe the warning is credible. If information is presented to actors at the individual, organizational or community level that is understandable, it does not necessarily mean that actors will act. Mead (1934) previously demonstrated that human beings are reflexive organisms in that there is not a simple stimulus-response feedback loop. Rather, humans interpret symbols such as warnings and threats in the environment and attempt to determine what, if any, action must be taken. Although the threat or warning may be clearly and effectively transmitted by public health officials, it will not be acted upon if it is not deemed credible. Prior research by Shibutani (1966) has noted that when there is a shortage of reliable information from institutional channels, such as from public health officials, auxiliary channels of within organizations and communities may emerge as actors demand for information may exceed the supply. This imbalance between often credible institutionalized channels may result in the proliferation of rumor and consequently inaction as actors are unsure of the legitimacy of warning claims. Therefore, public health officials must strive to provide clear, accessible information presented in a manner that reaffirms and reassures actors that a warning is credible and a threat is imminent. Often this credibility can be enhanced through actors’ proximity to a threat (i.e. SARS outbreak at a nearby high school) and environmental cues which support the
message (i.e. nearby cesspools which serve as mosquito breeding grounds for West Nile virus) (Diggory 1956; Donner 2007; Mileti and Fitzpatrick 1993; Tierney 1987).

Third, **actors often confirm a threat.** Although an actor may receive a message and deem the warning credible, actors frequently attempt to independently confirm a threat or warning. Research on the threat and warning confirmation process has produced some important and somewhat counterintuitive results which are of great relevance to the public health preparedness community. For example, one might believe that actors are most likely to attempt to confirm a threat if they only hear one warning message. However, Nigg (1982) found that the more times people receive warning information, the more likely they are to attempt to confirm the warning. One might also believe that if a warning is conveyed through an institutional channel, such as a public health official or the media, actors would attempt to confirm the warning from similar institutional channels. However, research by Kirschenbaum (1992) found that a majority of those who attempted to confirm institutionalized warnings, sought confirmation through auxiliary channels such as friends and neighbors. Finally, it is important to note that public health crises which would merit warnings run counter to most rational action for actors. For example, in most social settings, rational decision making and the seeking of confirmation through independent sources is a valuable behavior which often produces better results in the decision making process as diverse perspectives are often evaluated before action results. However, in emergencies and crisis situations, the delay to heed a warning can result in an increased risk for morbidity or mortality.

Fourth, **actors personalize the threat.** Researchers have noted a fundamental difference between the belief of a threat or warning and the personalization of the threat (Donner 2007; Lindell and Perry 1983). Perry, Lindell and Greene (1981) found that actors are more likely to respond to a threat if they personally believe to be a stakeholder in danger. In addition, research has also found that actors are more likely to respond to a warning when they observe other doing so as well in close proximity (Mileti and Darlington 1997).

Fifth, **actors determine whether or not protective action is needed.** Although much of the research on protective action refers to disasters, specifically the threat of hurricanes and tornadoes, this principle has some relevance to public health preparedness as well (Donner 2007; Moore 1958; Tierney et al. 2001). For example, although an actor may personalize the threat,
the decision on what action an actor should undertake is a subjective decision open to a variety of interpretations, actions or a lack thereof. For example, Donner (2007) noted that some actors may believe that if institutional actors and organizations, such as public health officials and organizations are attempting to handle the crisis, no additional action is necessary. Similarly, Moore (1958) found that some actors believed that deities would save them from harm and thus, and protective action taken on their part are inconsequential amongst such larger deterministic social forces. Consequently, if public health officials require actors to take protective action, they must not assume the personalization of a threat will directly result in the desired action. Rather, public health officials must make every effort to clearly articulate the protective action and ensure that the action will be followed by actors to minimize exposure and risk.

Finally, actors determine whether protective action is feasible. Although an actor may understand a warning, believe a warning is credible, confirm a warning, personalize a warning and deem that protective action is necessary, an actor may be limited in the feasibility of protective action due to a variety of social forces. For example, actors may not know the location or a shelter to take protective action or may not know where public health departments or emergency rooms are located (Donner 2007). Also, undocumented, or perhaps uninsured actors may refuse to take protective action during a crisis for fear of being deported, relocated or may not have the financial resources to do so. Recent research in disaster such as Hurricane Katrina and public health research suggests that perhaps the greatest barrier to taking protective action is not a willingness to do so, but lacking the social and financial resources to take protective action (Barnshaw 2006; Barnshaw and Trainor 2007; Braveman 2007). Public health officials must be aware and must coordinate with local, state and if necessary, federal officials to ensure that all actors at risk of a crisis have the adequate social and financial resources to take protective action.

Search and Rescue

There is widespread consensus among specialists that: (1) SAR is social, collective behavior of volunteers who share a culture and act as socialized human beings and are members of a human community; (2) Preexisting and emergent organizations, social statuses and social identities, such as neighborhood and work place relationships and family and neighborhood social identities, serve as a basis for the emergence of new SAR groups and constitute the
fundamental concepts and categories that are needed to understand and improve SAR activities; (3) SAR activities do not emerge from a vacuum; as an example of the principle of continuity advocated by Quarantelli and Dynes (1977), there are always elements of the traditional social structure embedded within collective behavior entities, and their emergent division of labor, role structure, and activities are also dependent on prior social relationships and forms of social organization in the community or region; (4) Breakdown models of social organizational patterns in disaster are not useful to understand SAR. Television reports and misinformed reporters often misinterpret throngs of people moving seemingly at random at the sites destroyed by various hazards, and assume that the people were disoriented immediately after impact and had lost their ability to enact social roles. Despite these reports, scientific research shows the absence of widespread confusion, lack of coordination, and panic (Aguirre, 2005). The seeming disorganization and aimless movement of people is the result of their individual and collective acts as they try to accomplish multiple individual and collective goals under severe time constraints (c.f. Fritz & Mathewson, 1957). Creative problem-solving and rationality is a more accurate way of understanding their actions (Aroni & Durkin, n.d., p. 30).

Search and rescue (SAR) activities are part of a complex emergency system that emerges to respond to disasters, what has been termed helpful behavior in emergencies (Dynes & Quarantelli, 1980). During more than 40 years, disaster researchers (for information on SAR during the Kobe, Japan earthquake of 1995 see Kunii, Akagi, & Kita, 1995; for the Kocaeli, Turkey earthquake of August of 1999 see Mitchell, 1999; for the Bam, Iran earthquake of December 2003 see Memarzadeh, Loghmani, and Jafari, 2004); near-exhaustive literature reviews are available in Poteyeva, 2005) have endeavored to understand what accounts for the relative success of SAR activities in disasters, to include factors such as the nature of structural and nonstructural damage to the built environment. The most extensive study of SAR activity was undertaken during the late 1970s by Drabek, Tamminga, Kilijanek, and Adams (1981), who conceptually recast the study of search and rescue into an emergent, inter-organizational, systemic approach. While reaffirming a number of the previous observations made in the literature up to that time, their study highlighted the inter-organizational managerial difficulties inherent in SAR. They found four common operational problems: (1) difficulties in interagency communications, (2) ambiguity of authority, (3) poor utilization of special resources, and (4) unplanned media relations. Quarantelli (1983) analyzed the problem of locating victims and
managing their entrance into the emergency medical system. Glass et al. (1977, 1979) provided epidemiological evidence on the etiology of injuries and deaths that had obvious implications for SAR behavior. To restate the disciplinary consensus (see an earlier summary by Wenger 1990 and literature cited therein): 1. Volunteer and emergent group response is of critical importance. 2. Volunteers and emergent groups accomplish the initial SAR activities. 3. Since most survivors are rescued within the first 2 days, this emergent and volunteer activity is critically important to the rescue effort, especially because buried and entrapped victims are likely to suffer from injuries that require rapid life-sustaining intervention including compromised access to air, severe loss of blood and body fluid, crushing injury, and internal damage to essential organ systems. 4. Despite the massive attention they usually receive from the mass media (Quarantelli, 1991), most of the time urban search and heavy rescue (US&R) teams arrive too late to rescue anyone; instead, they undertake highly specialized recovery activities requiring sophisticated skills and equipment. This is due in large part to the particular nature of the social geography of disasters in which US&R teams are hampered by problems of timely access. 5. The integration of volunteer and established organizational activities is seldom efficiently achieved; many official responding organizations, particularly those from national governments, usually do not appreciate the work of the volunteers in SAR operations since they are often perceived as lacking sufficient credentialing, specialized training, and tools. In turn, the absence of disaster planning about how to use volunteers creates problems of its own as large number of volunteers converges on disaster sites (Quarantelli, 1996c). Problems of management of rescue activities are serious and include difficulties in coordinating activities across independent, autonomous organizations, disagreement over rescue strategy, and ambiguous authority relationships.

Dynes and Quarantelli (1980) identified four types of disaster volunteers, whom they term organizational volunteers, group volunteers, volunteers in expanded roles, and volunteers in new roles. As (Dynes 1970) had theorized earlier, in the typical SAR site these types of volunteers become part of the process of organizational emergence involving extending, expanding, and emergent organizations, the last one often playing key roles in SAR activities (Quarantelli, 1999). Preexisting networks of human relationships are used to alleviate novel and unexpected collective problems that demand immediate attention. People expand their sense of responsibility toward each other, and often do so by becoming members of new emergent groups that carry out SAR activities. Afterwards, there may be the institutionalization of these groups.
SAR activities are part of the mass assault phase of disaster. As such, multiple individual and collective actors participate in it. Many trapped victims are rescued by the uninjured bystanders and surviving local emergency responders (Aguirre et al., 1995; Auf der Heide, 2004; Durkin, Coulson, Hijar, Kraus, & Ohashi, 1987; Durkin & Murakami, 1988; Kunkle, 1989; Noji, 2003; see other literature in Poteyeva, 2005; Prater et al., 1993). For example, in southern Italy, in 1980, 90% of the survived trapped victims were extricated by untrained, uninjured survivors who used their bare hands and simple tools such as shovels and axes (Noji, 2003). Following the 1976 Tangshan earthquake, about 200,000 to 300,000 entrapped people crawled out of the debris and went on to rescue others (Noji, 2003). These volunteers became the backbone of the rescue teams. Durkin and colleagues (1987, 1988) specified that the primary rescue technique used by the SAR teams and volunteers was the human voice of victims as they tried to alert their rescuers or as the rescuers called them, crying for help or making noise with available objects. An important mechanism in this regard is the thousands of local volunteer organizations that carry out SAR activities throughout the United States. The majority of these volunteer organizations came about soon after there was a mass emergency, a disaster, or there were cases of missing persons in their communities for which there was no organization available to assist in the response. In a recent ongoing attempt to quantify this activity, we found that the earliest team in our non-representative sample of teams (sampling frame included only those with Web sites during August 2004 to September 1, 2005) was the Hood River Crag Rats Mountain SAR, from Hood River, Oregon founded in 1926. We have identified more than 1000 SAR voluntary organizations in all 50 states, with more than 50 organizations in some states. Initially, most of these organizations were involved in mountain and wilderness search and rescue activities, although nowadays they engage in water rescue as well as a host of other response activities in the aftermath of mass emergencies and disasters. The most frequent team capabilities are: K-9 teams---31% of the teams had them; water rescue, 26%; technical rescue, 22%; wilderness rescue, 21%; mine rescue, 17%. Seventy-one percent of the organizations are supported by public donations, fund raising, and membership support; the breakdown for main sources of support mentioned by our respondents is: donations--- 56% of the teams mentioned it; sponsors, 41%; fundraising, 21%; member support, 13%; private grants, 8%; city, county, state governments, 15%; others, 6%. They compose a nascent industry in which, despite the recent effort by the Federal Emergency Management Agency (FEMA) to create a National Mutual Aid
and Resource Management Initiative, there are at present no uniform training standards or certification. Instead, these organizations follow various professional standards such as those of the National Association of Search and Rescue (NASAR) and FEMA, although many are not certified by these national organizations; most have developed their own regulations: 6% of the teams in our sample train to NASAR standards and 2% to FEMA standards. NASAR estimates more than 50,000 SAR missions annually. Unpaid professionals carry out more than 90% of these missions. While not all of their activities are associated with mass emergencies and disasters, the sheer numbers still give a sense of the importance of these voluntary organizations. Perhaps the most splendid recent example of this type of activity was the heroic efforts of people who owned boats and engaged in rescuing their fellow citizens in the aftermath of Katrina, supporting governmental organizations carrying out these operations. They saved 1000s of people who would have otherwise drowned.

In contrast, another type of social actor, the urban search and rescue taskforces, has received a great deal of financial support and public attention. In the United States, the Urban Search and Rescue System (US&R) is a collection of multidisciplinary taskforces created from local emergency responders organized under a federal framework for response in the aftermath of structural collapses. These task forces arrive at the site complete with the necessary tools, equipment, specialized training, and skills. They were created to be deployed by FEMA at times of catastrophic structural collapse to engage in such varied activities as structural shoring, canine searches, complex rope systems, confined space entry, and technically assisted void search procedures, although for a number of reasons explored elsewhere (Trainor & Aguirre, 2005) they are now being used to do many other things not initially contemplated when the system was formed. In parallel, other taskforces are being formed by state governments in the United States and by national governments. FEMA’s US&R System is of fairly recent origin, with the first US&R taskforce certified in 1991. The development of heavy rescue search capability was initiated in California, after the 1971 San Fernando Earthquake (Naum, 1993). In 1990, FEMA, fresh from the problems created by Hurricane Hugo and the Loma Prieta Earthquake, organized a week-long meeting in Seattle, Washington where more than 90 specialists representing various constituencies met and developed the outlines of the program. They set up a system of local US&R taskforces that would be made up of personnel from local agencies and who would be federalized and deployed nationwide at the request of FEMA. State emergency management
agencies were only marginally involved in the organization, which instead instituted an organizational link between the taskforces and FEMA. The taskforces have structural engineers to assess risks created by the configuration of collapsed structures, medical and hazardous material personnel, canine units, and very extensive cache of sophisticated tools and equipment for use in heavy rescue environments. When fully implemented each has more than 200 people. Today there are 28 US&R taskforces. One of the great paradoxes of the present system is that U.S. federal and state funding is directed to these taskforces even though they too often arrive too late to save anyone, and that this is done to the near exclusion of the thousands of voluntary SAR organizations that do most of the rescuing and savings of lives in the United States.

The effectiveness of local SAR voluntary organizations and formal organizations such as fire departments in locating and rescuing victims is in part a result of the interaction of ecological characteristics of the site of the disaster with other factors such as the (1) the social, cultural, and behavioral patterns and social relationships between victims and responders; (2) behavior of victims during entrapment; and (3) nature of the buildings and other structures and their collapse configuration.

Search and Rescue and Death and Injury

The morbidity and mortality patterns associated with disasters depend on many factors. Recently, Bourque, Siegel, Kano, and Wood (2006) reviewed the causes of death in disasters. They write: In most disasters, the majority of deaths occur because people drown, are crushed by collapsing buildings or other structures, are hit by moving objects, or are thrown against structures and objects. People drown in hurricanes, tsunamis, and floods, with death often occurring instantaneously. People die from crush and multiple traumatic injuries in tornadoes, earthquakes, hurricanes, tsunamis, and terrorist bombings. In hurricanes, floods, and tornadoes, people who are in motor vehicles, motor homes, and outdoors are at greater risk of injury or death; in earthquakes, people who are outdoors are at less risk of injury or death. Burns and asphyxiation are major causes of death and injury following volcanoes, terrorist bombings, and probably in wildfires. Many of these deaths could be avoided if warnings and evacuation plans were better and more effectively disseminated. Physical injuries are the primary cause of nonfatal casualties after all disasters; the majority is soft tissue injuries and fractures, generally to the arms and legs. When electrical service is disrupted, the use of generators and other sources of
light and heat lead to increased incidents of carbon monoxide poisoning and burns. After every disaster, certain myths emerge about how disasters affect the health of populations. Prominent among them are the misconceptions that dead bodies cause disease, epidemics and plagues follow every disaster, local populations are in shock and unable to function, and outsiders are needed to search for bodies and bring supplies. In particular, our review did not find any evidence to support the popular belief about disasters and the occurrence of infectious disease outbreaks. Jean Luc Poncelet, Claude de Ville de Goyet, and Eric Noji have been among the most persistent in trying to address these misconceptions (e.g., de Ville de Goyet, 2004; Noji, 2005, n.d.; Poncelet, 2000).

Cultural and social arrangements are often of primary importance (Pomonis, Sakai, Coburn, & Spence, 1991). Reflecting cultural practices, occupancy of buildings by time of day and season is significant in determining occupant exposure to specific hazards (Durkin et al., 1987; Tiedemann, 1989). Kuwata and Takada (2002), in their study of the 2000 Western Tottori earthquake noted the low occupancy of buildings at the time of the disaster as a major reason for the low number of dead and injured; the earthquake occurred at 1:30 p.m. on a weekday, meaning that the inhabitants of the building were awake and at once perceived the dangers of the earthquake. In addition, the most important factor was that the majority of people were not at home; the inhabitant occupancy was estimated at 27%. Another issue is the increased vulnerability to disasters of minority group members and residents of low-income households. These categories of people have lower ability to protect themselves from disaster. Income is positively related to access to better and safer housing and location. Older, un-reinforced masonry buildings and mobile homes, which are highly susceptible to collapse in earthquakes, constitute an important source of affordable housing for lower-income residents in earthquake-prone cities such as San Francisco and Los Angeles. Religious and ethnic minorities are often impacted by a number of erroneous assumptions about the management of the dead in the aftermath of major disasters which are often used to guide SAR activities. In Nicaragua, in 1998, because of an avalanche at the Casitas Volcano brought about by heavy rains from Hurricane Mitch, more than 2000 people died. Acting under the erroneous belief that human bodies are public health risks, and violating the rights of victims and their relatives to a burial in accordance to religious beliefs and local cultural practices governing the handling of the dead, the army incinerated more than 1000 victims; the rest were buried. None were identified. To this day they
are listed as persons that are missing, an ambiguous status that creates legal and other difficulties for their surviving kin (Pan American Health Organization, 2004, pp. 163-170).

Several studies examine the relationship between changes in response time and the saving of trapped victims (Coburn & Hughes, 1987; Kunkle, 1989; Pomonis et al., 1991; Quon & Laube, 1991). Kunkle claims that 80% to 90% of entrapped victims who survive are recovered in the first 48 hours after the disaster impact, and that many more entrapped victims could survive with timely delivery of appropriate medical care. Comfort (1996, p. 134) reports that in the 1995 Kobe, Japan earthquake the percentage of those rescued who survived was 80.5% for the first day after the earthquake, 28.5% for the second day, 21.8% for the third, 5.9% for the fourth, and 5.8% for the fifth day. Quon and Laube developed a predictive model that suggests that a 10% to 20% reduction in response time would yield a 1% to 2.5% reduction in fatalities. In the 1988 Armenia earthquake, 89% of those rescued alive from collapsed buildings were extricated during the first 24 hours. Noji et al. 1990; see also Olson & Olson, 1987) documented that most lives are saved and victims rescued during this immediate post-impact period. The probability of being extricated alive from the debris declined sharply over time, with no rescues after day 6. Noji (1991) points out that people have been rescued alive after 5, 10, and even 14 days of entrapment, but these constitute rare events. Pomonis et al. (1991) stress the importance of a victimís health condition inside a collapsed building at any given time; surviving entrapment can be expressed as a function of time and the injury level sustained at the moment of entrapment. Other factors need to be accounted for as well, such as exposure; dehydration or starvation after a long period of time; weather conditions and the amount of air voids that are created within the rubble; the weight of the rubble above the victim; and the victims’ pre-entrapment health condition. Pomonis et al.is study provides a number of empirical illustrations of the potential interplay among the mentioned factors. Entrapment is the single most important factor associated with death or injury (Durkin & Murakami, 1988). As Noji (2003) states, in the 1988 Armenia earthquake, death rates were 67 times higher and injury rates more than 11 times higher for people who were trapped than for those who were not. Certain age groups are more vulnerable and have an increased risk for death and injury in disasters and others. People older than 60 years of age have a death rate that can be five times higher than that of the rest of the population during earthquakes. Children between 5 and 9 years of age, women, and the chronically ill also have an elevated risk for injury and death (Glass et al., 1977). As Noji (2003) points out, limited mobility
to flee from collapsing structures, inability to withstand trauma, and exacerbation of underlying disease are factors that may contribute to the vulnerability of these groups. He also stressed the effect that certain social attitudes and habits of different communities may have on mortality distribution by age. For example, in some societies young children sleep close to their mothers and may be more easily protected by them.

Scientific studies of the behavior of victims in disasters are infrequent. While in need of replication, the few studies that have examined issues ranging from general behavioral patterns of communities during disasters to what building occupants did during the actual period of a disaster and experiences of trapped victims during SAR operations show that the much-feared social disorganization during the disaster periods is extremely rare (Aguirre, 2005; Durkin, 1989; Dynes, 1970), although conditions under which panic does occur have been identified in the literature (Dynes, 1970; Johnson, 1988). An atmosphere of human solidarity and cooperation characterizes the behavioral processes during and in the aftermath of a disaster. Residents of disaster-stricken areas are proactive and willing to assist one another. Research findings show that volunteer activity increases at the time of disaster impact and remains widespread during the emergency period (Dynes, Quarantelli, & Wenger, 1990). In the Guadalajara Gas explosion community residents who were not trapped or freed themselves from entrapment went to great lengths to search for their kin and neighbors (Aguirre et al., 1995). There were instances when individuals would call attention to other victims who were trapped nearby and could not free themselves; they would also speculate about the possible location of other victims, provided rescuers with information about the inner settings of the house, and reconstructed the architectural topography of the streets turned to rubble. Sometimes the victims, when trapped, were able to hear what was going on above or next door and thus maintained social ties with the world around them. They also engaged in imaginary interaction with significant others and saints, seeking spiritual and psychological support, which is so important for survival. More recently, Scanlon in a recent observation (2005) of the London Underground July 7th 2005 terrorist explosion also shows that victims helped fellow victims, that staff operating the trains helped the passengers, and that the first responders were not emergency personnel but people nearby, among them medical doctors who worked at the British Medical Association as well as workers from other commercial establishments. Studies have paid particular attention to the importance of family as an institution during mass emergencies and disasters (Form & Nosow, 1958; see
also Aguirre et al., 1995; Alexander, 1990; Quarantelli, 1988). Family is a very powerful unifying factor for disaster victims, and, as Alexander points out, its influence could immediately dissolve other groupings such as friends. Family members are the first to be rescued by their kin. As soon as the nuclear family is reunited they concern themselves with other relatives. Second in importance is the concern for immediate neighbors and other nearby residents, and then other people farther removed from the spheres of everyday interactions (Aguirre et al., 1995). While in need of replication, a research finding is that the chances of people surviving the Guadalajara explosion were directly proportional to the presence among the searchers of a person or persons who acted as proxies for the victims, reminding the searchers that the family member was missing, and supplying information about their possible location. Preliminary results from studies of building occupant actions during disasters and trapped victims behavior suggest that victims behave actively and assume responsibility over their rescue to the extent that they can do so. Thus victims trapped as a result of the Guadalajara gas explosion moved their bodies ever so slowly to create more room in the rubble; others called attention to themselves by screaming and making noise on the nearby debris (Aguirre et al., 1995). Seven of the eighteen victims trapped in the dormitory after the 1985 Mexico earthquake attempted to escape (Durkin et al., 1987).

Empirically, SAR activities in disasters divide into two distinct stages to correspond with the normal chronology of these events and associated collective activities (for an extended example see City of Oklahoma, 1996), namely the search for live victims and the search for human remains. Different collective actors pursue different tasks in these stages, and the stages themselves change very rapidly. Local actors dominate the first stage. In it the acting units are groups of volunteers, as well as representatives of private businesses and governments—such as police, utility workers, EMS and other medical personnel—either acting as volunteers or as employees. Initially, the stage is marked by the absence of command and control procedures at the site, which are gradually introduced, usually by the local fire and police departments, during the first few hours after the onset of the disaster events. In the second stage, dominated by the search for human remains, personnel from extra-local organizations, most importantly USAR units in the United States, become part of these emergent inter-organizational SAR systems. In the first stage, in most instances, fire departments have de jure jurisdiction over disaster sites. Nevertheless, other actors usually initiate SAR and determine their initial features, and fire departments gradually assert control. The initiators of SAR are volunteers, either individuals or
networks of individuals who share organizational or social network identities unrelated to emergency response (City of Oklahoma, 1996). At the mature phase of this first stage, extra-local actors from neighboring communities and regional and state-level actors join the SAR. The increasing number and variety of actors, particularly extra-local actors are key features of emergence in large-scale organizational SAR systems. Medical and emergency medical system personnel also are key actors in this early SAR stage. The provision of Emergency Medical Services (EMS) during SAR takes place at the disaster site during this stage within the context of an emerging organization of volunteers and professionals (Schultz et al., 1996; McEntire, 2002). Usually, volunteers with technical knowledge of engineered structures are also very important throughout the SAR sites at this stage.

The search for human remains marks the second stage. The set of actors in this stage of SAR is somewhat different from the first. Usually, volunteers, emergency medical personnel, and utility personnel become much less relevant. The same is true for police and other social control personnel, for in this stage they act in a de jure capacity, having established appropriate traffic patterns and secured the perimeters of the disaster sites and criteria for access and egress to them. Matters of safety for the personnel at the site mark the stage, with much greater importance given to decisions by structural engineers and other technical personnel regarding the stability of collapsed structures as well as the presence of bio-chemical hazards. Also distinctive about this stage is the usually near simultaneous occurrence of the re-establishment of command and control over the disaster sites by local fire departments and the presence in these sites of extra-local actors, the most important of which in the United States’ context are FEMA’s USAR units, other FEMA personnel, and state emergency management staff. SAR operations resulting from terrorist or criminal actions also involve the FBI and state law enforcement agents.
Part 2. Annotated Bibliography

This section provides an overview of what we did to build the annotated bibliography, in an effort to provide both transparency and the potential for future replication. It provides an overview of the source material explored, the methodology employed, challenges we faced, and the feasibility of replication.

Public Health Journals

For over a century public health scholars, researchers and professionals have established peer and scholarly reviewed outlets for the transmission and dissemination of knowledge produced for the public health field on a variety of issues including, but not limited to, crisis, pandemics, emergencies, preparedness and response. Over time, this literature has become increasingly prolific and difficult to assess without a standardized metric for evaluating the scholarly knowledge production of public health research. To this end, we utilized the standard scholarly metric of an impact factor to rank the journals and then evaluate the Top 25 journals by their score. An impact factor is a numerical computation of the number of times articles published over a three year period referenced by indexed journals. Frequently, impact factors are utilized as a proxy for prestige or substantive contribution to the field, which is the position this report adopts. Once the impact factor score was established, we proceeded to explore the journals with the 25 highest impact factors utilizing the following search terms “crisis,” “disaster,” “emergency,” “epidemic,” “pandemic,” and “preparedness” for a period of five years. The five year window chosen was 2002 – 2007 because 2007 marked the last full year of scholarship completed at the time of the analysis. December 2007 was chosen as a cut point for because some journals have rolling embargo walls, which prevent institutions from accessing the most recent content for a specified period of time. For example, suppose a journal has a six month rolling embargo, or lead time, from distribution of its printed journal circulation to its electronic journal distribution. This means that the August 2008 issue of the journal would not be available for analysis until February 2009. Thus, in order to improve the ability of replication and consistency the last month in which the sixth month embargo would have been available when our analysis began for all the electronic journals in July 2008 was December 2007. Table 1 presents the Top 25 journals, scored by impact factor as well as the number of articles surveyed between the years 2002 – 2007.
Since all journals did not have an electronic search function, for 6 journals we used the posted abstracts to determine the article relevance based upon our initial six search terms. After retrieving these articles, each abstract was read to determine relevance to the following question, “How does this article contribute to our knowledge and understanding of public health emergencies or preparedness?” If, after reviewing the abstract it was determined that the article did not contribute in a substantially significant way, the article was deleted from the analysis. This abstract review resulted in the reduction of articles from 421 to 145 as indicated by Table 1. After reading and summarizing each article, at least two project members reviewed the articles to
determine their substantive relevance and overall contribution to the collective understanding of public health emergencies and preparedness. If it was collectively determined that the article made a substantial contribution to the literature, the article was summarized and appears in the annotated bibliography. Of the 145 articles initially explored, many were deemed not to have made a substantial contribution to the literature, as the search terms used provided conceptualizations that were not beneficial to the understanding of emergent disruption of individuals, organizations and communities. For example, some articles may have contained information about public health preparedness on epidemics, but this information was related to "routine epidemics" such as heart disease and cancer. Some of the articles that fell into the excluded content category include articles pertaining to heart disease, colorectal cancer, malaria, bacterial infections, general influenza and the "crisis" of substance abuse, breast cancer as an epidemic, cervical cancer emergencies, HIV transmission (particularly in Sub-Saharan Africa) and tobacco use as an epidemic.

The greatest methodological challenge encountered in accessing the Top 25 journals was gaining electronic access for the entire five year period surveyed. Two journals (American Journal of Health Promotion and Drug Safety) did not offer institutional access through our institutional affiliations. However, both journals did have electronic access to the abstracts which were evaluated and upon the determination of article relevance, the authors of relevant authors were contacted for article inquiries. Two of the authors did respond and provided us with the articles as well as additional articles which were included in the personal contact section below.

**Disaster Journals**

Over the past quarter century disaster researchers from a variety of disciplines have established peer and scholarly reviewed outlets for the transmission and dissemination of knowledge produced for the reduction of hazards and disasters nationally and internationally. Traditionally, this research has included, but is not limited to, disasters, crisis, pandemics, emergencies, preparedness and response. Over time, as this literature has become increasingly prolific journals and scholarly outlets have come and gone, but four publications have emerged as some of the most widely recognized and respected in the field. These journals include
Disasters: The Journal of Disaster Studies, Policy and Management, International Journal of Mass Emergencies and Disasters, Disaster Prevention and Management: An International Journal and Risk Management: An International Journal. Although none of these journals are under a rolling embargo, it was determined that the same survey period between January 2002 and December 2007 employed for analysis in the public health journals should also be employed for the disaster journals. Due to the overwhelming number of articles on disasters, emergencies and preparedness, in disaster journals, our search terms were narrowed to include only “epidemic” and “pandemic” for these journals. After reviewing the titles and abstracts of each article from these journals during the five year time period, a total of 19 articles were determined to substantively contribute to the overall understanding of public health emergencies or preparedness and 6 appear in the annotated bibliography.

E.L. Quarantelli Resource Collection

Over the past forty years, The E. L. Quarantelli Resource Collection at the Disaster Research Center at the University of Delaware has developed into the world’s largest and most complete collection of materials pertaining to the social scientific research and behavioral aspects of disasters and includes more than 55,000 items. The E. L. Quarantelli Collection is unlike any other disaster catalog or library in the world due to its extensive collection of first hand reports, “grey material” and preliminary papers not found anywhere else. Due to the overwhelming number of articles on disasters, emergencies and preparedness, in the Collection, our search terms were narrowed to include only “epidemic” and “pandemic” for a total of 761 items. Since the Collection includes disaster related journals including Disasters: The Journal of Disaster Studies, Policy and Management, International Journal of Mass Emergencies and Disasters, Disaster Prevention and Management: An International Journal and Risk Management: An International Journal, these relevant articles were deleted due to duplication. In order to provide a greater degree of uniformity, the list of materials was narrowed to the same time frame of 2002 – 2007 as delineated through the Top 25 public health journals search, narrowing the number of articles from 761 to 498 articles that substantively contributed to the overall understanding of public health emergencies or preparedness. 21 appear in the annotated bibliography.
Personal Contacts and Institutional Documents

In addition to the reliance of other contacts for this report, team members recognized that several institutions and universities are actively engaged in the production and dissemination of knowledge related to public health emergencies and preparedness in the United States. Some of these institutions include the Centers for Disease Control and Prevention, Harvard School of Public Health, University of California at Los Angeles Center for Public Health and Disasters, University of Michigan School of Public Health and Yale School of Public Health. While these institutions do not have a monopoly on the production and dissemination of public health knowledge, each does have a distinguished track record of publications in esteemed peer reviewed publications as well as serving as clearinghouses for the dissemination of public health emergency and preparedness information. While each of these sites are easily accessible through the Internet, the selection of materials incorporated in this report is somewhat less replicable as the question, “How does this material contribute to our knowledge and understanding of public health emergencies or preparedness?” was somewhat subjectively applied to the search throughout each of these sources. Additionally, they provided links to other institutions, scholars and materials which were included in this report. A total of 7 documents from these sources appear in the annotated bibliography. One team member was given access to an extensive bibliography that proved useful in locating some materials beyond the Top 25 peer reviewed publications.

Annotated Bibliography Entries


The article explored if there was an increase in cardiac events in 16 New Jersey Emergency Departments within a 50-mile radius of the World Trade Centers. The only statically significant finding is a 42 percent increase in acute myocardial infarction after September 11, 2001. Keyword: Disaster, Surveillance

Johns Hopkins Center for Public Health preparedness piloted a “Road Map to Preparedness” curriculum in 2003 with over 1500 employees at six health department in Maryland. The program puts written plans into action to improve readiness through gaming, by providing trainees with time-efficient, intrinsically motivating learning opportunities for promoting organizational development in a variety of ways. These ranged from teaching management skills, conveying information, providing an appreciation for the complexity of organization decision making and allowing trainees to experience the consequences of organizational decision and realizing the importance of interpersonal process. Future research will seek to evaluate the short and long term efficacy of the Road Map to Preparedness program. 

**Keywords:** Public Health Preparedness


This article explores public health preparedness. The authors of this research article apply the Haddon matrix tool to two hypothetical situations, one involving a SARS outbreak and another involving a dirty bomb, to illustrate the tool’s utility and flexibility for understanding, preparing for, and reacting to a spectrum of intentional and naturally occurring public health threats. The authors found that the Haddon matrix can effectively aid public health agencies in addressing specific gaps and requirements that must be filled to meet readiness needs. It can also serve as a helpful model for disaster preparedness in a variety of contexts. **Keywords:** Crisis, Public Health Preparedness, Modeling


This article explores the Chernobyl accident by assessing established health consequences. It identifies unanswered health issues while evaluating the international response, and considers how to improve the response to future technological accidents. The authors note that in order to ensure adequate understanding of the health problems following Chernobyl, studies must continue for the lifetime of those exposed to the accident. This would require the creation and funding of a structure similar to the Atomic Bomb Commission, which could provide an appropriate framework for Chernobyl studies. **Keywords:** Crisis, Public Health preparedness, Surveillance

This article investigates two outbreaks of acute ocular and respiratory symptoms associated with exposure to indoor swimming pools located in two hotels in central Illinois in January 2004. The authors describe the illness syndromes, determine risk factors for illness, and develop recommendations to prevent future illness. They concluded that the 72 persons who became ill with respiratory and ocular illness had been subjected to chloramine exposure. Proper ventilation is required to decrease exposure to chloramines in swimming pool environments. The researchers state that it is critical to improve the training of pool operators in swimming pool chemistry and maintenance. Recommendations include that Health Departments be prepared to investigate outbreaks within hours of their identification. Keywords: Emergency, Public Health Preparedness


This article reviews a book entitled Preparedness Against Bioterrorism and Re-emerging Infectious Diseases. The book is a collection of presentations given at a NATO Advanced Research Workshop entitled ‘Preparedness Against Bioterrorism and Re-emerging Infectious Disease—Regional Capabilities, Needs, and Expectations in Central and Eastern European Countries’ held in January 2003 in Warsaw, Poland. The book provides some useful information in the discussions of epidemiology, the role of the laboratory, and surveillance. Keywords: Crisis, Public Health Preparedness


This article identifies the earliest age groups within the pediatric population that develop influenza and that are most likely to die from it. The authors used real-time syndromic surveillance systems to monitor patient visits for respiratory illness in six Massachusetts healthcare settings. Findings indicate that preschool-age children are the first to seek health care for respiratory infections, and appear to play an important role in influenza transmission. These results support arguments for a recommendation by the Advisory Committee on Immunization Practices to begin to universally vaccinate preschool-age children. Keywords: Emergency, Public Health Preparedness


This article estimates the numbers and age distribution of cases and deaths during an influenza pandemic in the United States, based on the patterns from the 1918-1919 pandemic. Findings estimate an incidence of between 24 to 34 percent, with an overall mortality rate from 4.4 to 6.7 per thousand. The authors note that under all pandemics scenarios, most deaths occurred among those aged 25 to 29 years. There was also high proportions of deaths in middle-aged and elderly adults using the estimated population for 2006. Keywords: Pandemic, Public Health Preparedness, Social Policy

The devastation caused by Hurricanes Katrina and Rita in 2005 resulted in the loss of hospitals, clinics, pharmacies, medical records, and employer-subsidized medical insurance, and serious long-term health consequences for a large number of New Orleans residents. A total of 1,171 adults and 488 children from 820 households from 14 FEMA-financed housing sites across Louisiana were interviewed about chronic medical conditions suffered by their family members, their children’s emotional and behavioral status, their previous and current access to health care services, medical insurance coverage, and the family’s post-hurricane displacement history. 

Keyword: Crisis, Public Health Preparedness, Social Policy


This article presents a framework to monitor the efficacy in real time of control measures of communicable diseases. Utilizing epidemic curves and a subset of traced cases, this mathematical model requires no prior knowledge of the disease and can be used for emerging communicable diseases. The authors conclude that their statistical framework for real-time surveillance of emerging infectious diseases will benefit public health decision makers who have to determine in real-time whether to reinforce control measures. Keywords: Epidemic, Surveillance


This article discusses the 2001 anthrax attacks, providing examples from 4 case studies involving state, county, and local agencies in New Jersey. It explores organizational factors that caused risk communication problems and organizational strengths that helped avoid them. The authors find that existing organizational and professional networks facilitated trust among decision makers and that this inter-personal trust resulted in improved communication among agencies and improved risk communication with the public. Recommendations include future research on the inter-organizational and inter-personal arrangements that facilitate effective risk communication. Keywords: Crisis, Public Health Preparedness


This article investigates the relation of several measures of network centrality to the risk of infection after emergence of a novel infectious disease among fully susceptible individuals living in isolated populations. The authors identify a number of network centrality measures that may be useful predictors of individuals’ risk of infection and time to infection. Findings include measurements and analyses of contact networks that may enable greater understanding of infection dynamics in populations and may inform surveillance and control procedures. Suggestions include further research to determine the most appropriate centrality measure(s) for
prediction of infection in models utilizing context-specific population contact structures and transmission parameters. **Keywords: Social Networks, Surveillance**


This study evaluates whether the implementation of various types of hospital physician integration strategies, such as the responsibility centers system, total quality management, and physician fee programs, and whether they enhance efficiency for Taiwan hospitals. Findings indicate that central systems that hold employees of each department in the hospitals accountable for their performances result in greater efficiency. The system also produces a higher degree of autonomy, greater incentives for health centers to control costs, and enhance outputs. Implementation of responsibility centers and total quality management also tends to encourage teamwork, an essential part in health care delivery. **Keywords: Crisis, Public Health Preparedness, Social Policy**


This article discusses some of the disadvantages of the Bioterrorism Preparedness Programs that have been implemented in recent years. The impetus for this examination of Bioterrorism Preparedness Programs was several deaths and serious illnesses resulting from the smallpox vaccination program that resulted from the release of anthrax spores (which have been linked to a secret United States military laboratory). The authors find that the recent expansion of Bioterrorism Preparedness Programs has been a waste of health resources, has increased the dangers of accidental or purposeful release of dangerous pathogens, and has undermined the efforts to enforce international treaties to ban biological and chemical weapons. The authors suggest that public health organizations should take a critical look at the government’s bio-preparedness agenda and advocate for a comprehensive program that promotes global health security. **Keywords: Disaster, Public Health Preparedness, Social Policy**


This article discusses some of the problems that have arisen in the field of public health since September 2001. Specifically, the article focuses on the powers of government during health emergencies. Findings suggest that the biggest problem is that many legislators, physicians, and hospital executives accord higher priority to protecting privacy and property in a time of peril than to collective solidarity and the effective use of government authority. The authors discuss the Model State Emergency Health Powers Act and subsequent debate which has revealed that a large number of Americans question and even reject the principles on which public health authority has rested. In addition, findings suggest that trust must be restored between public health officials and the public in order to effectively protect against bioterrorism and other threats. **Keywords: Disaster, Social Policy**
Quarantine and isolation (quarantine being the more controversial of the two) are two commonly used epidemic control measures. This article uses probabilistic methods to determine the conditions under which quarantine is expected to be useful. Findings suggest that the number of infections averted through the use of quarantine is very low provided that isolation is effective. 

*Keywords: Epidemic*


This project uses a Monte Carlo simulation to explore the efficacy of prophylaxis during a potential influenza epidemic in France. Based upon a probability derived from 10,000 simulations, findings indicate that total population influenza vaccination prevents, on average, 368,500 hospitalizations and 86,000 deaths. Although a dose of influenza vaccine would cost six Euros, or six times more expensive than a dose of Oseltamivir, the latter requires a larger number of doses. *Keywords: Epidemic, Public Health Preparedness*


It is a literature review of published studies that were conducted in the United States between 1970 and 1999 on the completeness of disease reporting. Findings indicate tremendous variation in the completeness of infectious disease-reporting, which is strongly associated with the disease or condition being reported. In addition, findings in this review provide general support for the commonly held belief that active disease surveillance results in more complete case enumeration than passive surveillance methods. The authors recommend keeping ongoing maintenance and evaluation of surveillance systems. *Keywords: Surveillance, Emergency*


This article uses stochastic modeling to examine how case isolation, contact tracing, and surveillance impede the spread of smallpox in a highly susceptible population. Findings demonstrate that a smallpox outbreak in a population with 20 percent immune may be controlled by means of contact tracing and case isolation alone. Specifically, in less than six months the outbreak reaches extinction without causing on average more than 550 secondary cases per 100 initial cases. The author concludes that case isolation, contact tracing, and surveillance are highly effective measures that involve the public as an ally in the response to bioterrorist attacks. *Keywords: Epidemic, Surveillance*

This article evaluates historical data on an epidemic that occurred in 1967 in Nigeria to estimate how smallpox spread to members of the same compound, to other close contacts, and to remote contacts. The authors examine to what degree smallpox was transmitted during the fever period that preceded the rash. Findings support the widely held belief that smallpox spreads slowly among close contacts, and that infectivity before the onset of rash was negligible. These results also indicate that if the variola virus was deliberately released into the population, the existence of reserve stocks of vaccine would ensure containment of an outbreak. Keywords: Epidemic, Surveillance


In the spring of 1993, a massive outbreak of Cryptosporidium occurred in Milwaukee, Wisconsin. An estimated 400,000 people became ill. The authors of this article examined the contributions of three transmission pathways--environment-person, person-person, and person-environment-person—in producing cases associated with the outbreak. Findings suggest specific roles of transmission and conferred immunity, and they further demonstrate the importance of understanding the natural history of the Cryptosporidium disease process. Keywords: Epidemic


This article explores individual preparedness for a terrorist attack in Los Angeles County. It used a random digit dial telephone survey. Findings indicate that individuals with a lower socio-economic status, who lacked Internet access, and were older, were less prepared for disasters. In addition, among minority groups (African Americans, Asian Americans, Latinos), African Americans were found to be most likely to have an emergency plan. Recommendations include improved preparedness measures for the most vulnerable, specifically those who are poor, the elderly and certain minority groups. Keywords: Disaster, Public Health Preparedness, Social Policy


This article explores the implementation of Project Liberty, which provided free public education and crisis counseling services after September 11, 2001 terrorist attacks. Project Liberty used a media campaign aimed at building public awareness of the program through 30-second television ads featuring Yankees Manager Joe Torre and actress Susan Sarandon as well as radio spots in English and Spanish and subway and bus placards developed by the New York City Department of Health. It featured verbatim statements from New Yorkers detailing their coping strategies to the September 11, 2001 attacks. Throughout Project Liberty 4,154 individuals who lost a family member during the attacks received crisis counseling within one year of implementation. Project Liberty may serve as a model for future mental health and
counseling programs in the aftermath of major incidents. **Keywords: Disaster, Public Health Preparedness, Mental Health**


This article finds that two thirds of local public health agencies report that their local communities are not fully prepared for a bioterrorist attack. Nearly a quarter of these agencies told the National Association of County and City Health Officials that they have no response plan for bio-terrorism; only one-fifth had a comprehensive plan in place. The National Association of County and City Health Officials highlight the gap in public health readiness is wide and varied. Recommendations included federal policymakers to requesting $10 billion over the next 5 year to help public health departments prepare and respond to bioterrorism. **Keywords: Public Health Preparedness, Social Policy**


This article explores Project Liberty, a nearly $10 million, three-phase multifaceted, multilingual mental health awareness media campaign following the terrorist attacks on the World Trade Center. This study evaluated the association between patterns of spending with this campaign and the volume of calls received and referred to a counseling program. Results indicate that call volumes to mental health services increased during months when total monthly expenditures peaked. **Keywords: Mental Health, Public Health Preparedness, Social Policy**


This article discusses a study that was conducted to determine what sort of emergency response plan a hospital distant from the immediate site of an incident (involving a hazardous materials release which could include chemical warfare agents), must develop to protect healthcare professionals if they receive contaminated victims. Results of the study indicate that level C PPE will protect healthcare workers. The authors conclude that development and coordination of emergency response plans must include the local emergency planning committee, with clear assignments of tasks, locations, and training. **Keywords: Emergency, Public Health Preparedness**


Crisis and emergency risk communication is a function essential to public health agencies, particularly as emerging acts of terrorism and large-scale natural disasters threaten the physical and mental health of large groups of people. This literature review defines crisis risk communication, traces its origins to a number of applied fields, and shows how basic principles have become incorporated into emergency preparedness and risk communication for public health. Although it may appear as though much progress has been made to incorporate risk
communication principles into public health practice, the author concludes that this emerging field lacks in-depth evaluation of the effectiveness of event-specific crisis risk communication efforts. **Keywords:** Crisis, Public Health Preparedness


The author reports that unlike natural disaster, terrorist events such as the attacks on September 11, 2001 created a greater sense of vulnerability and insecurity. The terrorist attacks have focused attention on the unprecedented need for rapid access to education about trauma and grief and to psychological services. Findings indicate requests for critical incident services came mainly from employers who had been based in or near the World Trade Center. Preliminary results indicate a major increase in the prescribing of anti-anxiety medications, mainly by non-psychiatric physicians. Recommendations include that psychiatrists need to be current on the latest perspectives on critical incident interventions. The United States government should take advantage of the potential synergies of these national resources and use them in a coordinated manner with local, state, and national government organizations. **Keywords:** Mental Health, Public Health Preparedness, Social Policy


This article reports on findings from a symposium of public health participants who engaged in a series of exercises in an attempt to provide consensus on key dimensions of community capacity. Among the consensus findings are the need for citizen participation, social networks that generate trust, cooperation and confidence and an understanding of community environment, social context, history, and power relations. The authors conclude with a series of recommendations including the need for greater interaction among community health professionals and community groups along with additional research on public health preparedness at the community level. **Keywords:** Community, Public Health Preparedness


This article analyzed the monthly percentage of deaths attributable to pneumonia and influenza among people aged 65 or more years in the contiguous United States from 1968-1998. The authors’ focus was on identifying patterns in influenza-related mortality in order to improve epidemic prediction and prevention. Findings indicate marked regional differences in pneumonia and influenza mortality, similarity in the pneumonia and influenza percentages of nearby states, and differences that cannot be explained by the age distribution of the elderly across states. The authors suggest that future studies should adapt their quantitative approach to examine the possible role of climatic factors in modifying regional pneumonia and influenza mortality. **Keywords:** Epidemic, Surveillance

This article addresses the extent to which public libraries in Ontario were able to respond to inquiries for health information during the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) in Toronto, Ontario. Sixty-nine libraries were selected at random and questioned by phone and e-reference about information regarding SARS, its symptoms, and prevention methods. The results indicate that some public libraries were ready and able to fulfill their service requirements, but there is considerable room for improvement in others. The authors suggest that without a clear mandate there is unlikely to be a sense of what is a reasonable standard or level of service to expect in public libraries. *Keywords: Crisis, Public Health Preparedness*


This article explores the mental health needs after the September 11, 2001 terrorist attacks. Utilizing a mixed methods approach that included the development of exposure categories for classification of affected persons, combining Census data, government reports, and media reporting, the authors found that approximately one third of persons directly exposed to the 1993 Oklahoma City blast developed Post Traumatic Stress Disorder (PTSD) directly related to the event. Based upon these results, the rate of PTSD in the hospitalized and injured subgroup was estimated as 34 percent. Overall, the available data following the September 11, 2001 attacks indicate that the rate of PTSD among close family members of deceased, injured, hospitalized, or otherwise severely traumatized persons was assumed to be very high—although there is no consensus in the estimates. *Keyword: Disaster, Mental Health, Public Health Preparedness*


This article offers an update on previous evaluations of Europe’s national pandemic influenza preparedness plans and assesses the progress that has been made. Methods included published national pandemic influenza preparedness plans from the European Union countries, the two acceding countries (Bulgaria and Romania) and from Norway, Switzerland and Turkey. Plans were eligible for inclusion if formally published before 30 September 2006. Twenty-nine countries had plans that were included in the analysis, compared with 21 countries in 2005. Substantial differences existed in countries’ plans for border control measures, and many plans diverged from WHO guidelines. *Keywords: Disaster, Public health Preparedness*


This article explores the relationship between medical relief supplies and actual medical demands of the approximately 18,000 Hurricane Katrina evacuees relocated to San Antonio,
Texas. Utilizing a syndrome surveillance system based upon patient chief complaint, findings indicate that the majority (68 percent) of all medications dispensed were treatment for chronic disease, with cardiovascular medications (39 percent) being the most commonly dispensed to evacuees. While federal relief teams supplied some medicines, (9 percent) the vast majority (73 percent) of doses were dispensed by retail pharmacies. Findings have substantial implications for mass evacuations following emergency or disaster. Keywords: Disaster, Evacuation, Public Health Preparedness


This article reports on the Pentagon Post Disaster health Assessment (PPDHA) survey created to document exposures and health effects following the September 11, 2001 attack in Washington, DC. Findings indicate that out of 4739 surveys completed, 40 percent of respondents were at high risk for one or more symptoms associated with generalized anxiety (26 percent), and panic attacks (23 percent), depression (17 percent), PTSD (7 percent), and alcohol abuse (2 percent). Findings highlight the need for additional funding and surveillance of Pentagon personnel following the September 11, 2001 attacks. Keywords: Mental Health, Surveillance, Social Policy


This article reviews the United States Department of Education plan for K-12 schools and reviews four problematic areas: planning and coordination, continuity of student learning and core operations, infection control policies, and communication planning. The author suggests planning should focus on student preparedness, and concludes by expressing the view that teachers should play a more prominent role in getting information out to the community and maintaining public confidence. Keywords: Crisis, Public Health Preparedness


This article demonstrates that initial clinical presentation of persons with acute lower respiratory infection could precede the laboratory diagnosis of anthrax by several days. Therefore, an early detection of a bioterrorism event might be possible if there is a surveillance system that rapidly reports unusually large numbers of incident episodes of lower respiratory illness in a community. This article discusses a method proposed by the authors that is based on generalized linear mixed models. The results indicate the effectiveness of this method, and the recommendations acknowledge that additional work in statistical models for cluster surveillance will be required to resolve some of the limitations. Keywords: Emergency, Surveillance, Public Health Preparedness

The article explores the behavioral patterns and attitudes of SARS prevention in the Hong Kong cross border traveler population to China. A total of 839 Hong Kong residents returning to Hong Kong from mainland China were surveyed and findings reveal that almost 30 percent found mask wearing to be highly efficacious for SARS prevention. Findings also indicate that nearly 70 percent of the respondents reported that they would not see a local doctor if they were having influenza-like symptoms in mainland China. These findings highlight the need for preventative measures in the general population and the need for early warning epidemiological surveillance systems, particularly among migratory populations. Keywords: Epidemic, Public Health Preparedness


An important aspect of the 2003 severe acute respiratory syndrome epidemics was the occurrence of super spreading events (SSE). Based upon the occurrence of SSE in the Hong Kong and Singapore epidemic, findings suggest that the daily infection rate did not correlate with the daily total number of symptomatic cases but with the daily number of symptomatic cases who were not admitted to a hospital within four days of the onset of symptoms. The authors conclude that various hypotheses derived from their analyses remain to be confirmed by further epidemiologic and clinical studies. Keywords: Epidemic, Public Health Preparedness, Surveillance


The influenza vaccine crisis of 2004-2005 provided researchers the opportunity to examine an alternative for future years. Specifically, this article explored the vaccination plans of multiple communities in Texas and Japan and found that the best strategy for minimizing the number of influenza-related deaths and morbidity from inter-pandemic influenza would be to concentrate vaccines in the high-risk and high-transmitting population groups simultaneously. Findings stress the importance of evaluating the program success; recommendations include monitoring and comparing the incidence of influenza in the different age groups between states with and without the strategy of vaccinating schoolchildren. Keywords: Crisis, Public Health Preparedness, Social Policy, Surveillance

This article focuses on the devastation caused by Hurricane Katrina in and around the communities of the Gulf Coast region, including perceived health threats and environmental health implications. Findings are divided into subcategories of water hazards, toxicants in sediment and air, debris, injury protection, mold, and carbon monoxide poisoning. Recommendations include how to better respond by including communication in advance and in the wake of natural and man-made disasters, and health officials being able to appropriately assess and respond to exposures. Roundtable participants agreed that most important is improvement across all levels of government in the following areas: evacuation planning, urban design, communication, environmental monitoring, and involvement of citizenry. Keywords: Disaster, Public Health Preparedness, Social Policy


This review summarizes relevant epidemiologic and clinical information and highlights valuable diagnostic and management tools for public health and medical practitioners who may be faced with addressing the recognition, management, and prevention of acts of water terrorism in their communities. The author finds that most practicing physicians and public health professionals have received limited training in the recognition and evaluation of waterborne disease, and may not be adequately trained to respond to a terrorist assault on water. Suggestions include public health officials and health care providers must become familiar with the appropriate methods for communicating with law enforcement agencies, public utilities, the media, and the public. Keywords: Crisis, Public Health Preparedness, Social Policy


This article discusses an integrated approach to security, environment, health, and safety (SEH&S) management from the perspectives of both professionals and organizations. The authors discuss current trends in organizational responses to Homeland Security, examine the rationale for an integrated approach to SEH&S management, describe the major steps toward creating an integrated management system model, and discuss the challenges and implications of the integrated approach. Findings suggest that systems-based and cross-functional approaches are needed in order for organizations across the globe to efficiently and effectively address future organizational uncertainties and increasing public expectations, while enhancing support for sustainability and environmental health and safety programs and initiatives. Keywords: Disaster, Public Health Preparedness


The incidence of S. Enteritidis infection among humans in Denmark increased in the 1990s, and the epidemic peaked in 1997. In order to address the hypothesis that consumption of raw or undercooked eggs was the primary risk factor for domestically acquired cases, the authors conducted a nationwide prospective case-control study. The study confirmed the hypothesis that contaminated egg shells are a primary source of human S. Enteritidis infection and that this risk is particularly associated with consumption of raw or runny eggs. They recommend that other
investigators who wish to address risk factors for food-borne infections should design their study questionnaire in a way that allows modeling of different exposure windows. Keywords: Epidemic, Public Health Preparedness


This article offers a glossary of common definitions for public health researchers and practitioners to use in discussion of public health preparedness. Some of the terms included are all-hazards approach, which refers to the functional integration of emergency management activities at all levels of government, with plans designed for a broad range of emergency situations. Capacity refers to the faculty or potential that an actor has for responding to an event that exceeds everyday resources. The article notes that mental health, disaster victims as well as responders can experience stress and anxiety resulting from a disaster that can manifest itself in a variety of symptoms at different points following the disaster. Keywords: Mental Health, Public Health Preparedness


This article discusses the decision to vaccinate whole populations against smallpox. The author suggests that any decision to vaccinate must await (1) better intelligence about the degree of threat from bioterrorists; (2) evidence that the vaccines are safe; and (3) that the introduction of the vaccines would not compromise the rest of the national immunization programs. Based upon these findings, the author recommends that smallpox vaccination should not be offered to the general population until these issues have been resolved. Keywords: Emergency, Social Policy, Public Health Preparedness


This article reviews some of the recent approaches that have been taken to develop measures of preparedness. Along with a review of the published literature, the authors review relies upon their own observations on preparedness which includes an assessment of California’s public health preparedness, tests of a measure of health department performance, the development and conduct of table-top exercises in 32 communities in 12 states, an examination of the public health-hospital interface related to preparedness, a study of the impact of variations in state/local intergovernmental structure on preparedness, and a review of quality improvement efforts in public health. The authors conclude with an outline of a conceptual framework for measuring preparedness, summarize two approaches to assess preparedness, discuss advantages, disadvantages, and appropriate uses of each, and conclude by discussing emerging challenges to assessing preparedness. Keywords: Disaster, Public Health Preparedness

The editorial proposes a definition of public health emergency preparedness and its key elements as developed by a panel of experts convened by RAND in February 2007. The authors describe what constitutes a public health emergency, what public health emergency preparedness requires, and who is involved in public health emergencies. The authors assert that the absence of a clear definition of Public Health Emergency Preparedness (PHEP) makes it difficult to determine whether the nation is adequately prepared to respond to a bioterrorist attack or disease outbreak. They feel that the definition and key elements presented will help provide a set of shared terms for discussion about what exactly is involved in enhanced community preparedness. Keywords: Public Health Preparedness


This article uses a hierarchical linear model of neighborhood residential effects on perinatal outcomes. Following a discussion of theoretical and methodological issues, findings suggest that further work is needed in developing and testing sound hypotheses and applying rigorous methodologies to perinatal outcomes. The author concludes by stressing that further gains in knowledge concerning etiology and the design of appropriate policies and interventions will not be made unless epidemiologists tackle these specific challenges. Keywords: Disaster, Public Health Preparedness

Ompad, Danielle, Sandro Galea, and David Vlahov. 2006. “Distribution of Influenza Vaccine to High-Risk Groups.” Epidemiologic Reviews 28:54-70.

This article reviews the recent literature evaluating influenza vaccination programs in different settings (medical, venue-based, and community-based) in an effort to identify the aspects of the most successful programs that will guide efforts to increase vaccination rates nationwide. Findings conclude that only a handful of the studies reviewed managed to meet the goal for their target population of 90 percent vaccination coverage for adults aged 65 years or older and 60 percent for high-risk adults aged 18-64 years. Recommendations for future research include improved evaluation of the impact of vaccination programs by race/ethnicity and socioeconomic status; and the targeting of individuals who do not have health insurance and are not connected to social services. Keywords: Emergency, Public Health Preparedness


A special colloquium titled “Unhealthy Landscapes: How Land Use Change Affects Health” was convened at the 2002 biennial meeting of the International Society for Ecosystem health. Experts worked to establish consensus on the current state of science and identify key
knowledge gaps. This article summarizes the working group’s report, offering a new research and policy agenda for understanding land use change and its effect on human health. The authors find that when considering issues of land use and infectious disease, public and public health officials need to give greater attention to entire ecosystems, not just their local environments. Recommendations also include a discussion of future challenges and the means by which they should be addressed. **Keywords: Public Health Preparedness**


The scale and complexity of the problems presented by Hurricane Katrina made it evident that no stakeholder alone could tackle them. This article describes the NIEHS Portal’s aims, and prospects for its utilization. Specifically, the authors find that the NIEHS Portal has the potential to bring forward crucial time-sensitive information that might not otherwise be readily available. However, they stress that decision-makers will have to rely on trained and experienced professionals to analyze and interpret those data and make intelligent and informed management decisions. **Keywords: Crisis, Disaster, Public Health Preparedness**


This article explores whether or not health care workers will report to work during a catastrophic event. Utilizing a survey 6,428 employees from 47 health care organizations, findings indicate 79 percent of respondents reported that they would be willing to work in another facility during a disaster. However, as the distance from home to the facility increased, only 69 percent reported a willingness to work. Only 25 percent reported a willingness to work in another country while only 17 percent expressed a willingness to work in another state. Of the potential disaster work scenarios, willingness to work was highest during a snow storm (80 percent), followed by a mass casualty incident (85 percent), an environmental disaster (84 percent), smallpox (61 percent), radiation (57 percent) and SARS (48 percent). These findings demonstrate fear and concern for mainly self (47 percent) and personal health problems (13 percent). **Keywords: Disaster, Role Abandonment, Public Health Preparedness**


This article discusses the response and role of public health officials following the terrorist attacks of September 11, 2001, and the subsequent anthrax attacks. Findings indicate the need for disaster planning and training for the entire health care workforce, as well as the need to improve coordination among agencies. Specifically, the anthrax attacks pointed to the need for an increase in federal and state funding to support a stronger public health infrastructure for monitoring and controlling unexpected outbreaks of infectious disease, enhancing preparedness through professional and public education, and stockpiling the necessary vaccines.
and antibiotics. Recommendations emphasize that now is the time to involve the public in public health, by encouraging people to volunteer their time on a regular basis, and the importance of creating partnerships between universities, hospitals, and community-based organizations. 

**Keywords:** Disaster, Public Health Preparedness, Social Policy

SARS Investigation Team from DMERI (Centre for Biomedical Sciences, Defense Medical and Environmental Research Institute, DSO National Laboratories, Singapore) and SGH (Virology Unit, Department of Pathology, Singapore General Hospital, Singapore). 2005. “Strategies Adopted and Lessons Learned during the Severe Acute Respiratory Syndrome Crisis in Singapore.” Reviews in Medical Virology 15:57-70.

This article reconstructs the events that took place during the February 2003 SARS (Severe Acute Respiratory Syndrome) outbreak. Findings reveal that communication was essential among staff, regular appraisal of diagnostics performance was important, as well as welfare and protection of staff, including preparedness to deal with sick staff. Recommendations include a discussion that individual clinicians must be vigilant in detecting suspicious circumstances and reporting them to the appropriate authorities. The authors conclude by stressing the importance of national preparedness for future outbreaks. 

**Keywords:** Crisis, Public Health Preparedness, Social Policy


This article reports on the Head-off Environmental Asthma in Louisiana (HEAL) Project, which was designed to assess the impact on asthma in New Orleans following Hurricane Katrina. Asthma is the most common chronic disease among children in the United States, and its prevalence has been increasing dramatically, particularly among minority children in inner-city urban areas, with nearly one-quarter (24 percent) of urban minority children suffering from the disease. The authors find that continuity of care and consistent management of a chronic disease such as asthma is often disrupted in inner-city environments by poor access to health care, which was the situation before Katrina; the aftermath has only exacerbated such access problems. Although this research is specific to post-Katrina Louisiana, the tone of the article highlights the broader need for improved post-disaster public health systems, particularly in areas traditionally providing services to poor minorities in urban areas. 

**Keywords:** Disaster, Public Health Emergencies, Public Health Preparedness


This article explores whether older adults with inadequate health literacy were less likely to report receiving influenza and pneumococcal vaccinations, mammograms, and Papanicolaou smears than individuals with adequate health literacy adjusting for other covariates. Utilizing a cross sectional survey, findings indicate that 23 percent of English-speaking Medicare managed care enrollees had inadequate functional health literacy and another 10 percent had marginal literacy. The authors conclude that individuals with inadequate literacy were more likely to be nonwhite, older, have completed fewer years of school, have lower income and have one or more chronic conditions, and have impairment in an instrumental activity of daily living.
Recommendations include interventions for these at risk older adults. **Keywords: Public Health Preparedness, Social Policy**


This article discusses how the recent events of September 11, 2001, the anthrax attacks, the flu vaccine shortage, and the response to Hurricane Katrina have shown the importance of public health emergency preparedness. Specifically, this article explores Quality Improvement (QI) for Public Health Emergency Preparedness (PHEP) and identifies a framework for how QI could be applied to PHEP. Findings suggest that in order for QI to flourish and become standard practice, it is necessary to improve training and education and integrate quality improvement into routine PHEP practices, as well as to align incentives to reward improvement in PHEP. **Keywords: Crisis, Public Health Preparedness.**


This article discusses the Dynamic Continuous-Area Space-Time (DYCAST) system that was developed to identify and prospectively monitor high-risk areas for West Nile virus in New York, utilizing Geographic Information Systems (GIS). Findings reveal that GIS can be used as an effective tool for targeting remediation and control efforts. Specifically, findings include issues of thresholds and the validity of significance tests, as well as reporting bias in areas of varied socioeconomic characteristics. Recommendations include ways in which GIS models can be further optimized. **Keywords: Public Health Preparedness**


The article explores the federal and state influenza pandemic plans. It describes and quantifies the presence or absence of ethical language in influenza planning. Findings indicate that the use of ethical terms in the federal plan and supplements did not vary greatly from the state plans. Specifically, published federal and state plans recognized an ethical dimension to pandemic influenza responses and identified a number of the ethical issues, although the documents were not specific in their ethical reasoning. In addition, the authors caution against determining the importance of ethical questions by the little attention given to them in federal and state pandemic plans. The authors conclude by noting that if ethical planning at state and local levels does not occur before a pandemic or other public health emergency, public health officials risk making unjust decisions. **Keywords: Disaster, Public Health Preparedness, Social Policy**

This report offers a summary of the more than one billion dollars dispersed by the United States government on bioterrorism preparedness. Over 20 percent ($205,000,000) was released in the first round of grants for the Fiscal Year 2001 – 2002, with dispersal of the nearly remaining 80 percent ($795,000,000) during the coming years. The funded proposals include 24 states, the District of Columbia and Puerto Rico. Among the funded proposals is a $7,298,076 grant for the funding of Delaware public health systems ($6,744,505 for Delaware bioterrorism public health systems, $110,714 for Delaware hospital plans, and $442,857 pending completion of Delaware public health system plans). Keywords: Bioterrorism, Public Funding, Delaware


This commentary explores the upper respiratory symptoms and related health effects among residents living near the World Trade Center site after September 11, 2001. Findings highlight the importance of disaster related health effects on the general population, as well as on health officials. In addition, findings raise questions about potential bias, assessment of exposure and health outcomes, and potential unmeasured confounding, which the commentary explores in detail. The authors conclude that carefully designed longitudinal studies are needed to identify possible longer-term effects of the environmental exposures that accompany disasters. Keywords: Disaster, Surveillance


This article discusses estimated age-specific transmission parameters by augmenting infectious disease data with auxiliary data on self-reported numbers of conversational partners per person. Utilizing mathematical transmission models that use transmission parameters based on social contacts, the authors are able to capture the observed age-specific infection patterns of mumps and pandemic influenza better than similar models that use transmission parameters based on homogeneous mixing or proportionate mixing. Findings reveal a direct connection between observations about the age-specific social behavior of persons in different age classes and the observed age-specific risk of infection. Recommendations include improved modeling in planning for interventions when little else is known about the infection besides its predominant transmission route. Keywords: Epidemic, Surveillance


The article assessed the use of mental health services among adult survivors of Hurricane Katrina in order to improve understanding of the impact of disasters on persons with mental disorders. Utilizing a telephone survey of 1,043 English-speaking Katrina survivors, findings indicate that an estimated 31 percent had experienced mood or anxiety disorder. Of those with mental disorders, only 32 percent used any mental services since the disaster. Findings also
indicate that of those who sought help, 60 percent had stopped using them. These findings highlight structural, financial, and attitudinal barriers for not obtaining care. *Keyword: Mental Health, Public Health Preparedness*


This article explores a continuum of disease progression from a health state to the end of life and includes primary prevention, factors that increase or decrease cancer occurrence in health populations, secondary prevention, screening and diagnosis, and tertiary prevention, factors that affect treatment, survival, quality of life, and palliative care. Utilizing data from the National Ambulatory Medical Care Survey and the National Employer Health Insurance Survey, the authors find that individual cancer risk is determined by the interaction of genetic factors and environmental exposure to factors ranging from tobacco to sunlight and cosmic radiation. They conclude that social policies such as state cigarette taxes, clean air laws, work site smoking policies and comprehensive investment in tobacco control profoundly affect exposure to cancer risks. *Keywords: Environmental Epidemiology, Social Policy*


Utilizing the state of New Jersey as a model, this article traces selected state health policies that address terrorism preparedness post September 11, noting the influence of federal policies. Findings reveal local health departments are better prepared to communicate effectively with local emergency response systems; furthermore, linkages between public health agencies and emergency response and medical care systems have been strengthened. In addition, laboratory services, surveillance, and reporting systems have improved greatly as health and medical care personnel are better trained to aid victims of disaster. *Keywords: Crisis, Public Health Preparedness, Social Policy*
Part 3 Answers to your questions:

Will people behave in orderly fashion for smallpox shots as they did in NYC in 1950's?

Yes, they will behave in an orderly fashion, provided that there has been an effective mass media campaign and programs in television and other material in the internet, involving trusted elected officials and others explaining to peoples the need for smallpox shots, the benefits and risks associated with the vaccine, and the costs and availability of this public health service, as well as detailed information on the program to dispense the shots. It is recommended that multiple sites should be available for the dispensing of this service and that they should be readily accessible. It is also important to develop procedures to communicate with minority populations and to serve special populations such as the elderly and the infirm which may not be able to travel to the sites. The sites selected for dispensing the drug should be stadia or other sites which usually handle the traffic of multitude of peoples, to obviate the possibility of difficulties as people try to obtain access to the medication.

Will assurance that there is enough medication keep people from hoarding or storming centers?

This question assumes that there will be an uncontrolled behavior of masses of people, most often referred to panic. However, there is considerable research in the social sciences of disasters disproving this assumption. Panic is a rare and well-specified medical condition. Obviously, in the mass media campaign and other television and Internet programs that will be needed (see comments above), the message should include the ample availability of medication and the fact that there will be enough for everyone. Equally necessary is to select appropriate sites for the dispensing of the vaccine and to explain the procedures to the public.

Will people wear facemasks at dispensing sites when diseases are contagious?

There is research that indicates that people will not come to dispensing sites if diseases are contagious because they have the well-founded fear that they will become ill. In this type of situation, other modes of dispensing the vaccine will be necessary; special physical and social arrangements will be needed to stop the risk of contagion at these sites so that people will come to them during the emergency. These arrangements must be done now, before the epidemic, and they must be communicated to people extensively, to try to convince them to use the sites. Face masks are only one of the instrumentalities that should be made available.

How do people react to special needs folks at medication dispensing sites on fast lane?

The sites that are selected for dispensing the medication must have clearly marked and separated areas. Some of these areas can be used only for special needs folks, so that there is no sense of competition with others. This is what is done by the airlines; before they board people they give preference to people with special difficulties who have been previously grouped in a well marked space in front of the door which leads to the airplane. In the present case, the geography of the presumed site should be explored to make these decisions prior to the incident. Once they are done, this information should be given to the people in the community, to let them know where they should go to get the shots.
Will people come to work equally for weather event as contagious disease?

Role abandonment is an old fear that according to extensive research is usually unfounded. Research shows they will show to work if the staff has the necessary medical equipment to protect themselves, is assured that the organization will take care of them and their families if they get sick, trust the organizations they work for, and believe that their families are secure during the emergency.

Is our presumption that we will give meds to their families increase essential worker's report to work?

Yes, the safety of family members is a key determinant of their willingness to report to work in this type of emergency.

What are the non-intuitive showstoppers for public non-compliance other than the obvious reasons such as don't believe the messenger, don't perceive the risk, incapable of receiving/comprehending message, incapable of taking protective actions.

Non-compliance is often the result of the absence of community-wide programs of public education and integration of community organizations with the public health institutions. Non-compliance is not a problem of people not wanting to do what they should, but of faulty community organization and network planning which would make certain behaviors part of community expectations and values.

Cultural differences - will they lead people to react differently?

It is difficult to answer this question since we do not know what they are reacting to, but in general people react similarly to major disaster incidents, irrespective of their cultures. It is the case that often time there are important social, educational, and economic inequalities associated with different cultural communities, which most definitely create different reactions, for example linguistic differences and inability to understand the English language together with the absence of means to let them know of the dangers. Thus, the problem is not culture per se but the social context in which cultural communities live. From a public health perspective, the problem then is to anticipate the effects of these cultural contexts and to try to find ways to ensure that people have the necessary information and resources that will be needed to respond to a disaster.

Is it true that mothers of school aged children will consider message sent via child most seriously?

We do not know the answer to this question. There is a great deal of research on warning systems and the characteristics of warning messages and of integrated warning systems. An excellent, high-quality on-going example worth examining is the hurricane warning system in place in the US. Usually one of a number of factors that impact the process is the credibility of the source of the message, but a number of other factors are in operation.
Have mass graves been accepted in catastrophes and how can they be made more accepting?

Research suggests that mass graves are often unnecessary and used in too hurried a fashion, based on the inaccurate belief that corpses are carriers of disease. Their acceptance is strongly linked to the religious beliefs and rituals of people of different faiths and nationalities. Whenever possible, the appropriate spaces for the practices of death rituals of different peoples and for the appropriate periods of mourning which would satisfy their traditions should be made available prior to burials.

For explosions or 911 scenarios, have they found it is more disturbing to be notified of persons DNA/body parts being found each time they are found or wait to the end of search?

As far as we know, there is not research on this topic. It presents a common predicament: when do you have enough information to act on the matter at hand? Our sense is that there usually is sufficient reason to notify the survivors that there is now scientific confirmation of the death of their relatives, as shown by DNA testing. Once they know it, they can go on grieving for their relatives and solving legal and other practical issues; they will also realize, given the nature of the incident and the mass media coverage of it, that it is possible that the searchers will find other body parts of the deceased. It makes common sense if allowed by law, to withhold information about subsequent findings of body parts for a reasonable period of time, until there are good reasons to assume that there will be no other parts found. In this fashion, the families do not have to go through the trauma over and over but can go on with their lives.

Should families be kept together in all cases (i.e. separating families as male/female for decontamination or keeping them together?

Families should be kept together if at all possible.
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