The
ASPEP
Journal
2003

ASPEP

AMERICAN
SOCIETY
OF
PROFESSIONAL
EMERGENCY
PLANNERS

ASPEP

The American Society of Professional Emergency Planner (ASPEP) is a professional organization of certified emergency managers dedicated to the advancement of knowledge of disasters and to the improvement of the practice of emergency management. ASPEP works towards these goals through continuing education, through professional development and exchange, and through the publication of an annual Journal.

The ASPEP Journal

The ASPEP Journal is a peer reviewed journal published annually in the fall. The Journal is dedicated to the sharing of ideas, research, lessons, practice, and new ideas. It is intended to serve as a forum for all disciplines involved in emergency management. A formal call for papers is issued in early January of the year of publication. Articles which will contribute to the goals of ASPEP are welcome.

Types of Papers

A call for papers will be issued in December 2003 for papers to be included in the 2004 Journal. Papers must be submitted by June 15, 2004. Publication of the 2004 Journal is planned for October 2004.

Articles or papers which contribute to the advancement of knowledge and improvement in the practice of emergency management are welcome. We encourage breadth of subject matter and depth of discussion.

Examples of subject matter which would be appropriate include:

> The state of the profession of emergency management, where the profession has been, and/or how it is adapting to the new environment.

> Research which will lead to a greater understanding of disasters, to their prevention or mitigation, to more effective response, to better recovery practices. Research which will establish a base for further research.

> Discussion of particular emergency management problems, resources, or procedures which have not been well addressed in the past.

> New ideas which will lead to improved understanding and practice.

> Studies of events or exercises and the lessons which may be drawn from them that would be valuable to practitioners in a similar situation.

Programs which may be used by other emergency managers.

Practices which have proven successful.

The Journal does not accept papers which are advertisements or infomercials for particular products.

Papers should be submitted electronically to the editor. Papers are requested to be submitted in MS Word or as a rich text file. Articles submitted in other formats will be returned to the authors with a request that the article be resubmitted in one of those formats. The usual lengths of articles are between 2,000 and 5,000 words, however longer articles will be considered on an exceptional basis. Shorter articles may be published in the Bulletin of the International Association of Emergency Managers. Articles will be submitted through the Journal Editor to a member of the Journal Committee for peer review. Each member of the committee is a professional emergency manager with years of experience and certification in emergency management. Where possible, authors will be given feedback on their articles. The Journal reserves the right to edit the submissions to fit into the Journal.

ASPEP sponsors a separate writing contest for college and graduate level students in programs in or associated with academic emergency management programs. The goal of this contest is to encourage emergency management students to begin to write to expand the knowledge within the profession, a habit we hope they will continue throughout their emergency management career. A separate announcement of this contest will also be published in December. The top three papers written by students will receive a monetary prize and will be published in the next edition of the ASPEP Journal. Student articles must be submitted by April 15, 2004. Questions should be submitted to the ASPEP Journal Editor.

We recommend you contact us if you have questions. For further information, contact:
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Five Types of Strategies
For Coordinating Disaster Responses

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Every year hundreds of communities throughout the U.S.A. have their "date" with disaster (see Mileti 1999 for frequency data and Drabek 1996b, Drabek and Gee 2000). Sometimes there is warning and thousands may flee inland prior to an approaching hurricane (Drabek 1996a; Sorensen et al. 1987; Peacock et al. 1997). But other times, destruction is sudden and citizens are forced to react as the violent forces of earthquakes, or even some tornadoes, quickly disrupt the familiar and put many in immediate danger (McEntire 2001; Drabek 1994). Regardless of the disaster agent, local emergency managers rapidly learn of the mobilization of the so-called "first responders", i.e., police, fire, emergency medical and others (Granot 1972; Hooper 1999). As media reports dramatize the event, the "mass assault" expands as would be helpers, both organized and individual, converge on the damage scene and at various organizational headquarters (see Fritz 1961; Barton 1969; Dynes, Quarantelli and Kreps 1972; Drabek 1986).

The key function of the local emergency manager is to facilitate the coordination among the diverse collection of agencies, organizations and volunteers who comprise what has come to be called "the synthetic organization" (Thompson and Hawkes 1962) or "the utopian community" (Taylor et al. 1970). Of course, wise emergency managers well know that their efforts during impending disaster will be hampered significantly unless they have done their homework (Perry 1991). Thus, during non-disaster times many seek to implement a variety of strategies that will build and nurture interagency contact and knowledge and of even greater importance, mutual respect and trust (Drabek 1987, 1990). Documentation of such structures has been completed, e.g., Wenger et al. 1987; Drabek and Hoetmer 1991; Gillespie et al. 1993), but the turbulence of disaster brings shifts in role (Wolensky and Miller 1981; Kuban 1993).

The local emergency manager always must think strategically; keeping sight of "the big picture" is required in both disaster and non-disaster times. But while specific strategies to nurture interagency relationships during non-disaster times have been documented (Drabek 1987, 1990), approaches used during actual crisis responses thus far have eluded researchers.

This paper provides some answers. Following brief discussion of the theory and methods used, five specific types of disaster coordination strategies will be illustrated: 1) core; 2) consequence; 3) customer; 4) control; and 5) cultural.

Theory and Method

The "stress-strain" theoretical perspective guided the data collection and interpretation process (see Haas and Drabek 1973; Drabek 1999). Consistent with key insights from

"emergent norm theory" (e.g., Aguirre et al. 1998; Perry 1985; Turner and Killian 1972) and "bounded rationality theory" (e.g., Burton et al. 1993), this perspective emphasizes that people, including local emergency managers, make choices. They vary widely, however, on the range of options they perceive. Past experiences and other social factors constrain their perceptions of the possible and the desirable. For example, decisions of agency heads take on new levels of "rationality" when one assumes, as this perspective directs us to do, that within the limits of the information available to them, agency executives will make decisions that they perceive will enhance the autonomy, security, and prestige of their unit (Drabek and Haas 1974). Their information base, like their perception of available options, reflects and is constrained by the structured strains that define the interagency relationships within which they are working. The patterns among these strains may shift when these multiorganizational networks are stressed through environmental turbulence resulting from a wide variety of stressors, including disasters of all types. Within their network of strained interagency relationships, emergency managers seek to implement a variety of strategies whereby to guide the emergence of the multiorganizational networks (EMONS) through which the demands of disaster can be satisfied, at least partially.

To explore the types of strategies that might be used by local emergency managers, data were collected that reflected this theoretical perspective. General questions about interagency coordination were followed with specific probes so as to ascertain the possible relevance of five types of strategies for reinventing government that were formulated by Osborne and Plastrik (1998). These were: 1) core; 2) consequence; 3) customer; 4) control; and 5) cultural.

Media sources were used to monitor community disasters that occurred between May, 1999 and February, 2001. Field studies were completed in ten communities during Fall, 1999 and Winter, 2000. While interviews were completed with 89 contact agency personnel (e.g., law enforcement, fire, public works, elected official) who participated in these ten disaster responses, this paper is limited to the responses of the local emergency managers. Telephone interviews were then completed with 52 additional local emergency managers whose communities were impacted during the study period. Disaster agents were: 1) floods (21%); hurricanes (27%); earthquakes (5%); wildfires (13%); and "other" (8%). The "other" category included large structural collapses, and a hazardous materials incident that triggered extensive evacuations (see Drabek in press for a detailed description of the research methods, including a listing of all 62 study communities and events).

Core Strategies

Effective managers must motivate key personnel to define purpose and mission for both the overall collectivity and component parts (Osborne and Plastrik 1998, p. 39). Within the context of disaster response, local emergency managers discussed three specific strategies that reflected this general category: 1) domain clarifications; 2) jurisdictional negotiations; and 3) resource familiarizations.

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Domain Clarifications

Most managers (74%) emphasized that during the warning phase of the disaster responses they did not use this strategy because it was not needed. Through prior exercises and training, agency domains had been established and so everyone knew their respective roles within the emergent multiorganization network especially during the warning phases of the response. During the evacuation and emergency response phases, the proportions reporting use of this strategy jumped to about 50 percent. During some point in the much longer restoration phase, a few more managers (54%) indicated some use of it. Thus, at some instance in the life cycle of the overall response, many confronted big surprises that had not been anticipated in their preparedness activities. So they improvised. Such improvisation is the second "pillar" of disaster response (Kreps 1991). One emergency manager laughed lightly upon hearing my probe, and then provided this illustration. It paralleled many others; only the circumstances varied.

> "Well, we had to get political. See we had an isolated diabetic who required insulin. I requested that a National Guard helicopter be used; due to the very bad weather we could not go commercial. There simply was no other way to get to this victim. Our state office of emergency management said that our request was turned down by the Guard and there wasn't anything they could do. They said it was our responsibility, that we'd just have to deal with it. So we talked to one of our political people and in that conversation we came up with the idea that maybe this could be viewed as a training mission. Next thing we knew the copter was in the air to pick up the supply for delivery." (All quotations from interviews were written after the interview was completed. These comments are based on extensive notes taken during the interview).

Others described negotiations regarding agency roles while some stressed new types of tasks the disaster circumstances precipitated. Since no one had foreseen these, some agency had to be encouraged to take on the responsibility. While the circumstances varied from event to event, these types of improvisations reflected the use of this strategy by many local emergency managers.

Jurisdictional Negotiations

In contrast to public images of panic and disorganization (e.g., see Fischer 1998, Quarantelli and Dynes 1972), disaster scenes more accurately reflect heroism and an outpouring of help. At times agency executives recognize a need and are quick to respond. Sometimes too quick. And then negotiations may be required. This was what one local emergency manager had to unravel.

> "Yeah, I got into this with our police and fire chiefs. Shortly after things got stabilized and we felt that the rescues were completed, we wanted a damage assessment. I was advised that the police had started a windshield survey. Then a bit later the emergency operations center (EOC) was informed that our fire department was deploying personnel to gather damage information. Neither

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agency head knew about the actions of the other, so right quick I had to get them on the same page. Fortunately, it wasn't a big deal, so we quickly worked out an arrangement that everyone could live with. This was less difficult than another incident when the county EOC asked us to provide some resource to another city. They needed our equipment and personnel but we had to be real careful in our dealings with them to make it clear that we were not trying to take over. Whenever you invade someone else's turf you'd better be damned careful."

Use of this strategy was most common during the restoration phase of the disaster life cycle (39%). Somewhat fewer used it during evacuation (31%) and the emergency response phases (34%). In those instances when warnings were issued, nearly all (89%) stated that they did not recall getting involved in jurisdictional negotiations.

Resource Familiarizations

Local emergency managers who have pressed successfully for preparedness, know their community well and how to access resources when they are needed. When necessary they also know how to request and obtain state and federally controlled resources. Since most disasters disrupt and damage only segments of a community, the abundance of resources is hard to realize. But they must be identified, authorized, and transported to needed locations. Despite years of hurricane responses and exercises, one emergency manager described a rather typical circumstance.

"You know, no matter how elaborate you plan, there always is something. For example, once we began evacuations prior to this hurricane, we decided to open up a certain shelter location. We never had used it before, but it was in a good location to serve as an overflow for one of the others that we heard was getting crowded. So right away I had to get the ball rolling for food. We had some stockpiled, of course, but certainly not at that location. Fortunately we have arrangements in place with our major grocery chains to get food supplies in a hurry and our voluntary agencies provided the manpower for distribution at the shelter."

The range and types of resources accessed varied enormously across these 62 disaster events. Many of these triggered "a Presidential" that is, formal authorization by the President for use of federal resources, including military, through a process implemented by the Federal Emergency Management Agency. This is done upon acknowledgement by the state's governor that local government has requested such action and that the disaster response requires resources that are beyond their capability to provide. But even when the disaster was of lesser magnitude, many local emergency managers reported use of this strategy throughout the life cycle of the response. The percentages reporting use of the resource familiarizations strategy was: warning – 81%; evacuation – 95%; emergency response – 97%; and restoration – 97%. Out of all of the strategies identified this one had the highest reported rate of use.

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Consequence Strategies

The turbulence of disaster can be acute. Trying to keep track of who is doing what, where, and when, quickly exceeds the capacity of any single individual or agency to monitor fully. As the scope and magnitude of disaster responses expand, so do the information processing requirements. And as additional agencies becomes involved, the communication links escalate exponentially. In their analysis of public agencies, Osborne and Plastrik (1998, pp. 130-131) identified three approaches or specific examples of this type of strategy: 1. enterprise management; 2. managed competition; and 3. performance management. Parallels were noted by these local emergency managers when I probed. I began by asking how they kept track of the consequences of decisions being made within the emergent multiorganizational network that comprised the "mass assault" (Barton 1969, Dynes 1970). With that opener, I was able to probe further and obtained numerous illustrations of how various strategies of this type were used.

The most significant structural tool was the activation of an emergency operations center (EOC) (Scanlon 1994). The community, city or county, facility is a fixed location with multiple communication resources. But hardware is only one aspect, and clearly not the most important. Personnel from key agencies are the essential element. When exercises, training, and prior disaster responses have occurred, this collection of individuals can function as a real group—a team really, wherein the local emergency manager serves as the coach. The community EOC often is augmented by other more specialized command centers which may be located on-scene and/or at various organizational headquarters (Emergency Management Institute 1995). If they function with a clear division of labor and continuing reporting to the community EOC, these *tactical command centers* can be integrated into a well coordinated response. Failure to integrate can bring predictable consequences as a few of the managers I interviewed described with tones of disappointment.

> "I really hate to tell you this, because our response to this tornado was not what it should have been at all. We just did not have much coordination between my county EOC and the actions taken by the city. The city manager tried to take over and really began to act independently of us. He had briefings twice daily—early a.m. and in the evening. But none of us knew what decisions were being made throughout the whole day. He and his people did not maintain any type of status board nor did they use the kind of multi-copy message forms. We see both as essential. Consequently there was just a lot of screaming across the room as we tried to keep track, but realized we could not. It was really chaotic."

Others told very different stories. And as I probed, three specific consequence strategies were illustrated again and again: 1) display of decisions; 2) use of information technologies; 3) maintenance of a hospitable EOC social climate.

Display of Decisions

Numerous tactics were implemented that reflected this strategy. For example, status boards were maintained that permitted personnel from every agency to be aware instantly of road closures. As security perimeters were established, these too were displayed with check point locations identified. As this information was updated, which occurred frequently, EOC personnel from each respective agency could relay it directly to their "home" unit. From there it could be further distributed through whatever mechanisms each had established. In this way, detailed information was circulated rapidly throughout the emergent multiorganizational network. The image here is not one of a "top-down" information flow, but rather that of a spider web. At the hub is the community EOC, and all of the other agencies are loosely bound together around this core node.

Among all of the tactics described that reflected the strategy of display of decisions, however, one was noted most frequently and appeared to be the most significant— briefings. Here is how one local emergency manager described their implementation of this during a recent hurricane.

> "We had, depending on the time of day, between 60 and 100 people in our EOC, most representing different agencies. Once we got well into the warning phase, I initiated an hourly briefing schedule. I give a very brief introduction regarding progress made on key problems that were identified during the last session. Each of these briefing sessions is very quick, you see. I keep them very focused. Then we go around the room across each of our emergency support functional groups. There may be personnel from four or five different agencies in each of these ten or so groups, you see. They identify key problems solved and those they are addressing. I may say, make sure you consider this and this. Or 'you may want to see if the people in ESF3' or whatever, 'can help you on that issue.' This regularized schedule is augmented by what I call a 'heads up.' This is used when someone gets a really critical piece of information, like we had in a previous hurricane, a major bridge went out. The first person to obtain that information from their headquarters via a field officer at the scene, immediately stood up and shouted 'heads up.' That way, everyone in the room got the information instantaneously."

Others reported variations in reporting frequency and procedure, but the briefing tactic was used widely in one form or another. The general strategy, i.e., display of decisions, was used during every phase of the life cycle of the response although its use increased progressively with each stage: warning – 83% (reported use); evacuation – 90%; emergency response – 92%; and restoration – 93%.

Use of Information Technologies

Like all other professional groups, local emergency managers are struggling to implement various information technologies into their programs. Since I documented the adoption

and early implementation of computer systems and hardware of different types into numerous local and state emergency management programs during the late 1980s (Drabek 1991), the pace has been astounding (e.g., see Fischer 1998, pp. 168-183 and Gruntfest and Weber 1998). The range of illustrations these 62 local emergency managers provided was equally astonishing although certain uses were emphasized by significant numbers. More than four out of five indicated use of this strategy during each of the four disaster phases studied, i.e., warning – 85%; evacuation – 82%; emergency response – 82%; and restoration – 82%. The following brief quotations from three different emergency managers illustrate the types of implementation typically reported.

> "We found our GIS (geographic information system) was invaluable. Immediately we had a computer generated map of the tornado path. In fact, our local newspaper used our map in their coverage. We later made layers of various other types of information on this map for use by the EOC agency reps."

> "Well we had a lot of e-mail use, of course, among many of the agencies involved. We established a victim inquiry file, so, you know, we could keep track. We also used the computer to log all offers of help from volunteers. We had a web site for donations and where to go work."

> . . .

> "We used a lot of technology, most importantly our in-house computer system. Each ESF group filed a situation report every six hours. We used these to compile an overall EOC report every day which was blast faxed to the state and all media outlets."

Maintenance of a Hospitable EOC Social Climate

As the overseer of the community EOC, many emergency managers told me how they tried to make the facility available for routine uses so other agency personnel became accustomed to being there apart from exercise participation. Small conferences, meetings, training sessions, and the like, brought people into these facilities on a regular basis. But during a disaster response the situation changed as the EOCs became centers of high activity, stress, and quickly, fatigue. Most (72%) reported use of various types of tactics reflective of this strategy during the warning phase of their response. The proportions that indicated this increased as things moved along through the evacuation (84%) and emergency response (85%) phases. During the restoration phase, the proportion dropped a bit (81%), but still remained high. Two examples illustrate a few of the many tactics they described.

> "We operate within ICS (incident command system). So we have a logistics officer designated who takes care of food and other 'creature comforts' required."

> "I had food brought in, that was no problem. But I had some trouble trying to arrange a relief schedule. People just stayed, some too long. I couldn't get them to leave the EOC and go home for rest."

Customer Strategies

Osborne and Plastrik (1998, pp. 181-183) noted that governmental bureaus have four different types of customers: 1) primary customers; 2) secondary customers; 3) compliers; and 4) stakeholders. When I asked these 62 emergency managers about this matter, three themes were emphasized: 1) communication of citizen expectations and requests; 2) facilitation of media relations; and 3) documentation of damage assessments. Unlike many of the other strategies, however, there was greater variability among these, especially the last two. The variability was reflected both in the range of tactics used and the degree to which the local emergency manager directed or even engaged in the relevant activities. Some of their activities were at a distance, sometimes quite a distance.

Communication of Citizen Expectations and Requests

When people sense danger, like seeing their furnace ablaze, they seek help by calling 911. This action will mobilize the appropriate resources during routine emergencies. In contrast, some local emergency managers explained to me that they viewed the mission of their agency as being a type of 911 resource for the 911 departments. When a fire department, for example, required a specialized piece of equipment, or just additional resources, they would turn to emergency management. And that is an important part of the agency mission that provides insight into the meaning of "customer" within this context.

In times of disaster, however, many things change. So, many emergency managers told me of their previous experiences with what had been called "rumor control centers." Individual citizens needed information and emergency managers augmented their facility, often having a separate room adjacent or near the EOC. Phone banks could be activated quickly and staff from several departments knew in advance of their assignment. In some communities, the 911 dispatch center is directly linked to or administratively part of the emergency management program. Such structural arrangements can facilitate the initiation of this type of citizen hot line center, but there is a danger. Several emergency managers explained to me the inherent conflict they experienced when they tried to assume dual roles during the disaster response. In addition to directing 911 programs, some others had responsibility for the EMS program (emergency medical service). Serving two "masters" simultaneously never is easy, and simply becomes impossible during a major disaster. Plans must be in place for the emergency manager to temporarily step out of these other assignment so that they can attend to their central function, i.e., facilitating the coordination processes within the emergent multiorganizational network.

During the warning phase, 72 percent of these managers reported use of this strategy through some type of tactic. The proportions jumped upward during both evacuation (94%) and the emergency response (97%). And it stayed high during restoration as citizens typically have many questions about relief resources (93%). While not included in my data collection, this type of activity continues at a declining rate for several months

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depending, of course, on the magnitude of the event. One of the more extreme events—an earthquake--elicited these types of actions.

> "We had people calling asking about guidance for dealing with their kids. So we had a mental health counselor make a presentation which was well attended. This person arrived armed with some very helpful pamphlets, you know, tips on dealing with your child's fears. We also had to go beyond English. So we had our building department do a presentation which we taped. Then we had translators go over it and we got sound tracks in different languages. This became what we called our 'Chimney Forum.' We followed this with additional presentations that were shown to the general public and used for staff training in several other city departments. We did one on the SBA loan process (small business administration), FEMA applications, and mental health."

Facilitation of Media Relations

Media personnel have a job to do and it is an important one within all free societies. But wise emergency managers understand how, when, and to what degree, media staff can be viewed as a community resource that functions cooperatively, rather than with conflict. A few emergency managers indicated that by administrative policy they were prohibited from meeting with media personnel. Undoubtedly, such policies reflected bad experiences wherein some department or another had been burned. One of the strengths of our society, however, is the important check on government officials that careful investigative reporting provides. This is but one of many inherent structural strains that promotes the public good, at least in the long run.

Most, but clearly not all, of these 62 local emergency managers used this strategy throughout the disaster response: warning – 66%; evacuation – 81%; emergency response – 81%, and restoration – 79%. Like their communities and the events they were trying to cope with, their approaches varied considerably. The following three illustrations are typical, but really only scratch the surface of this complex matter.

> "We have a real positive relationship with our local media. I have worked hard to keep it that way too. Whenever we activate the EOC, they are notified. We blast fax situation reports to them regularly. And when activated, or really as a part of our activation, we open up what we call 'the media room'. It is right off our EOC. They are not allowed within the EOC, but they are right there and our county public information officer (PIO) arranges for interviews. This way we help them get their job done—we have desks, phones, and plug-ins for their laptops—and they help us keep the public appraised of what's going on and what they could do that would help the overall community."

> "We have a County PIO who coordinates all interview requests. This worked fine for our local media people, but we had some problems when this thing escalated and became a national event. We had droves of 'outsiders' who arrived and

wanted access to everybody and everything. We hadn't really prepared for that type of onslaught."

"We learned a good lesson on this one. In the past, and this time too, we issued a series of press releases. But we don't have a full-time PIO; each department head does his own thing. This time we requested PIO support from two of the larger departments and we let them do the media contact. But this was not as well taken as when me or my assistant did it. In our office critique, we quickly saw this as a need in the future. So my assistant will be before the camera next time."

Documentation of Damage Assessments

More so than any of the other strategies discussed so far, this strategy was implemented later in the life cycle. A few were proactive, however, and initiated damage assessment actions during the warning phase (11%). More (45%) did so during evacuation, but most used this strategy during the later part of the emergency response (69%) or during restoration (84%). For some the matter was straight forward. They knew what information was required for their "customers" and how to obtain it. Others described more complex situations.

> "Basically we accomplish damage assessments with the help of our county Property Assessor's Office. They have a GIS data base that can be used once the damaged areas are identified. We also obtained a damage assessment report from our local Red Cross. So our role is to coordinate and verify, and, of course, see to it that the required training and interagency agreements are in place so all of this can be done smoothly."

> "Well, in our plan I had designated our public works department as the damage assessment team. But after the tornado rescues were over, our fire department proceeded to initiate a damage assessment within each of their districts. This information was then forwarded to me for county use. I also obtained a report from the Red Cross. So this is something I'm taking a hard look at for the future."

> "We should have done documentation of damage a little bit differently. The Red Cross was operating on their own and tried to do a limited damage assessment. The County Commissioners wanted to extend a deadline for people moving out. The time extension was granted but the timing issue upset some of the disaster victims, in some cases a great deal. They kept saying things like, 'Well, we are waiting for information; at what point can we go ahead and begin clean-up?' There was uncertainty regarding the new elevation requirements that might be required if they were going to try and fix up on their own. They were concerned about, on the one hand, not wanting to leave things as they were, but on the other hand, not doing anything that might alter any type of assistance that they might be entitled to receive. And we did not have good information to give them that provided adequate guidance."

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Control Strategies

Several different strategies were described to me when I probed this area. Wise emergency managers have learned the limits of their authority and the mixes of sponsorship bases represented by the diverse array of organizational units that comprise the multiagency network that emerges when disaster arrives. Some falter into paralysis by pushing for an answer to the question of "who is in charge?" Others more cleverly side-step this issue and through their coaching techniques quietly guide the emergent network toward relieving victim suffering and pushing the community toward recovery. From among a range of strategies that were described to me, let's focus on five that were described frequently: 1) reference to planning documents; 2) reference to prior disasters and exercises; 3) decentralization of decision-making; 4) emergent collaborative planning; and 5) emergent community-government partnerships. (See Drabek in press for extended discussion and illustration).

Reference to Planning Documents

Among those who had pressed preparedness activities, planning documents were most evident. So when issues arose, including those of turf, some emergency managers guided the network by quietly reminding agency personnel what they had endorsed previously. Even when controversy was absent, quick reference to prior planning meetings and discussions could bring people back to the same page. Decisions and solutions to problems could then move forward. When I probed, nearly all of the 62 emergency managers provided relevant illustrations: warning – 85%; evacuation – 94%; emergency response – 94%; and restoration – 97%.

> "We were able to implement the plan that had been designed and exercised for the county. This plan and our training exercises were strengthened through revisions that were made after two prior disasters, one of these was a Presidential. So when this tornado struck, we had a framework to guide our response."

Reference to Prior Disasters

As just stated, many emergency managers wisely saw the role of experience. And so, at times, they reminded those in the EOC of lessons learned from mistakes or improvisations made during prior responses. Through these reminders they coached their team toward victory; they had conquered before and they would do so again. Turf issues and personal hardships disappear into the background when your coach is pressing you forward, especially if you know first hand that this same coach got you through tough times before even if the event this time differs totally from the past.

> "We have hazards, but few disasters. Our most recent event was a winter blizzard during October, 1997. During our response to this flooding incident, this blizzard and the lessons we learned from it, were discussed from time to time by the personnel who reported to the EOC."

Decentralization of Decision-Making

This strategy is complex and frequently misunderstood. When disaster strikes, the task demands generated shift from the normal profile both in quantity but also in quality. In contrast to the community level system wherein numerous agencies operate with relatively high degrees of autonomy, this demand shift necessitates that *within* the emergent multiorganizational network decision making became more centralized if coordination is to be attained. Unfortunately, some emergency managers, or executives within other agencies, correctly sense this but then try to micromanage the activities of the responding agencies. Because of both the volume of decisions required, totally unexpected demands, and the routine procedures that are in place that reflect the relatively decentralized nature of government within the U.S.A. (Drabek 1985), such efforts are destined to fail. Osborne and Plastrik (1998) wisely noted this managerial error, even in times of less turbulent change. "Perhaps the toughest challenge is that of letting go. . . . this does not mean that elected officials should let managers do whatever they please. Steering is serious business" (p. 64).

In short, the emergent multiorganizational network, at the community level, requires that decision making *temporarily* became more centralized. But once goals and missions are identified, separate clusters of agencies, be they identified within the nomenclature of the incident command system (ICS) (Emergency Management Institute 1998) or the emergency support function model (ESF) (Drabek 1996b, pp. 5-18—5-20), must be given the autonomy and authority to proceed. In this way, the local emergency manager becomes the team coach, working directly with elected officials who provide policy guidance when required. Of course, individual personalities and community histories and population size, greatly affect the emergent patterns. Thus, *overall effectiveness does not depend on the degree of standardization among communities*, rather it is to be found within the capacities of local emergency managers *to steer* and guide the emergent multiorganizational network toward meeting victim needs in a timely manner. Most, but not all, of these 62 emergency managers articulated a grasp of this "big picture": warning (87%); evacuation (89%); emergency response (87%); and restoration (82%).

> "My position is that I go to others to solve various problems and get them to take various tasks. Our county manager is very important in this process and consistently tells others that I call the shots. There are some cases where I made decisions on things and then called the county manager and told him what I had done. For example, I made the decision on the hours of our curfew and the time at which it was going to be implemented. This is in accordance with our disaster plan. Now the county manager, of course, has the authority to make that decision. But because I have been in this job for 29 years, the current county manager gives me much more latitude and discretionary decision-making authority."

> "What we have developed here is a hybrid system that works for me. It reflects my ten years in the military and my several years in emergency management with the state. That is where I learned the emergency support function model from my

involvement with representatives of FEMA who also were trying to implement a somewhat similar model. When I left the state and began working at the local level, I gave some consideration to trying a version of the incident command system. But I realized that in reality, I really am not the incident commander. I'm in charge here mainly by the force of my personality not legal authority. I have seen some counties that try to use these ICS models in their emergency management program, but I don't think they work the way they are supposed to; its more a matter of just using the terminology. As it usually is practiced, the ICS reflects a highly autocratic and very rigid command and control approach. It seems to me that the consensus building approach is a much more appropriate model when you're working at the community level with such a wide mix of agencies and people from all kinds of backgrounds and training. As a result we have the county administrator who has delegated me to be the leading agency. He will chair an executive committee and I am the operations head. There's not a hierarchical arrangement beyond that point. Instead there is a tighter organization reflecting different functional support areas that are then clusters of various local agencies."

Emergent Collaborative Planning

As new situations and demands were identified during the disaster response, many of these 62 emergency managers described improvised planning activities that involved personnel from multiple agencies. These short term task force groups were assigned a problem and quickly reported back to the emergency manager when various options were identified. This did not occur too often during the warning phase (17%), but as the disaster response continued, greater numbers used this strategy (evacuation – 44%; emergency response – 48%; and restoration – 56%). The following example was provided by one of the local emergency managers whose community was impacted by a massive wild fire. The specifics varied from community to community, but the improvisation processes were paralleled.

"We had a lot of this because of the scope and duration of this fire. For example, I recall that when we finally were reopening the town, we were advised of a major problem at our hospital. It had been evacuated, of course, but incurred heavy smoke damage. Somehow we had to get it cleaned quickly, but a major wash down of this magnitude had never been envisioned by any of us in all of our exercises. So we got a task group to focus on this and they quickly devised a plan whereby our public works department would rent a huge sprayer. This machine was manned by National Guard personnel who really got the job done in a hurry."

Emergent Community-Government Partnerships

Frequently, resources are required from private sector agencies. Skilled emergency managers will develop agreements prior to a disaster so that these can be accessed quickly. So chain grocery stores and companies that have heavy equipment that could help in debris removal may have informal understandings or even formal "memorandum

of understanding" in place. When highly formalized some of these preparedness activities may even take the form of "mutual aid agreements" (for elaboration see Lerner et al. 2000). But improvised or emergent partnerships were born during many of these disaster responses especially beyond the warning phase (9%): evacuation – 40% emergency response – 47; and restoration – 53%. Of course, these percentages only refer to those emergency managers who acknowledged their use of this strategy. Many told me of such partnerships that they became aware of but were not instrumental in developing. Clearly such emergent partnerships represent an important sector of the improvisations used to conquer disaster.

"Well yes, there were a lot of these that me and the EOC staff got into place. We needed civic center locations where people could go as this hurricane approached. These were not our normal shelters, but rather, just safe locations they go to for awhile until we could be sure this thing wasn't going to take an unexpected turn. Fortunately, it didn't so it really became more of an evacuation event for us although we did have damages in some locations. Prior to getting this set up, we designated ten locations where people could go to pick up sand bags. Use of these reduced damages, but we had to get this in place quickly if we were going to expect people to use them. Now that we've done it, we'll have an easier time when the next one approaches."

Cultural Strategies

Doing disaster field work for over four decades in communities throughout the U.S.A. has afforded me unique opportunities to first hand observe the differences in organizational cultures. Not all Red Cross offices "feel" the same when you walk in the door, but none really are like a typical law enforcement facility.

"Organizations have distinctive cultures, much as people have distinctive personalities. Like people, some organizations are energetic, creative, or caring, while others are depressed, compliant, or neglectful." (Osborne and Plastrik 1998, p. 255).

So what types of cultural strategies might local emergency managers use to enhance the coordination of a multiorganizational network that was emerging during impending disaster? I documented and illustrated eight through my interviews, but will include only four here (see Drabek in press for elaboration and discussion of all eight of these strategies).

Enhance Awareness of Cultural Differences Among Responding Agencies

Some emergency managers did not seem to grasp this strategy, or at least they did not care to discuss it with me. Given the time limit of the telephone interviews, about one hour, I typically probed minimally here and focused on other areas that elicited immediate responses. Across the four disaster phases, the proportions indicating or

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illustrating use of this strategy during the disaster response were as follows: warning – 17%; evacuation – 29%; emergency response – 24%; and restoration – 26%. These percentages probably minimized the frequency that this strategy was used, however, due to the time limits of the telephone interviews and my decision to focus on other areas. In the field studies, wherein my interviews with the local emergency manager took place in three different sessions during a week long field visit, typically totaling six to eight hours, the use rates were significantly higher: warning – 50%; evacuation – 80%; emergency response – 50%; and restoration – 70%. One emergency manager provided the following illustration wherein he perceptively described use of this strategy and the cultural differences he sensed.

> "A good illustration of the cultural differences among the responding agencies is how they reacted to information that we obtained. For example, when a police officer received information and reached the conclusion that no action was needed, he did not report the information that he had obtained. To the storm water department, looking at the very same information, this would result in a high priority decision for fast action. So as the emergency manager, I was trying to make the police understand that they needed to disseminate the information. They had decided that something was unimportant, and as a result another agency had to tax their personnel to play catch-up. If the police would have reported the information quickly, we could have alleviated that stress on our storm water department personnel."

Another emergency manager, despite being on the telephone, went on at some length when I probed on this matter. He indicated that he believed this was a most important concept, but one that he never had encountered in any training programs. "It ought to be there; maybe your publications will help get the message out."

> "Yes. You see each department has a personality. Our public works people work well with personnel from our utilities. So we keep them together although they rotate the chair every few hours. They can resolve their differences despite the competition among them because they talk the same language, but its more than just technical terminology. In contrast, you have your PIO cluster. You really have to let them know who is in charge. They really differ from the fire culture. They're used to being heroes and are eager to be helpful. That contrasts to the police who seem to react as if its them against the world. Consequently, police personnel don't want to look indecisive or admit that they don't know. So they don't seek our help. In contrast, fire guys are quick to tell us what they need and we can get on it. But the police, they simply will not admit that they need resources. They had officers trapped under debris but they were reluctant to let anyone in the EOC know about this. They just don't seem to have the capacity to see the big picture and be able to open up for discussion of problems. They seem locked into an 'either/or' type of thinking. When you work with people from all of these different cultures in a high stress environment where there is a lot of uncertainty in the information coming in and things are changing rapidly, you really see this. Maybe the stress magnified these differences."

In-House School House

Multiagency critiques following disasters have become routinized within this emergent profession. Because of the timing of my interviews, some (21%) of the local emergency managers indicated that this strategy remained in process. That is, a critique of some type was being set up or would be soon. The restoration phase of the response had so taxed their agency and most others that they had kept this on back burner. Clearly, however, all of those interviewed recognized the unique potentials that this strategy afforded them. By having those who responded initiate ideas about how things could have been done better and identify the lessons from the disaster experience, future coordination can be improved. About eight percent, however, told me of a multiagency review that was initiated by some other unit of local government. So for various reasons, some emergency managers have allowed this potentially powerful strategy to escape from their agency domain.

> "Yes, anytime our EOC is activated we complete a debrief. I have found it best here to do this in stages. First, I gather all of the representatives who worked within one of our functional groups. This might be people from say six agencies, like utilities. Or it could be human services, law enforcement, administration, visitor relocation, or whatever. Then I sit down with a small group comprised of the heads of each of the functional support areas. We look for the key lessons that we can implement."

Celebrating Success

Behind the scenes, and frequently with resources from other agencies, about one-half (54%) of these 62 local emergency managers provided me with a wide variety of tactics they had used to acknowledge the work of so many. They fully recognized the bonding symbolism of a T-shirt that was imprinted with the date of a tornado and some type of logo. Ever hear of the "Debris Busters"? Appreciation banquets, picnics, and luncheons along with letters, certificates, and plaques were noted by different managers. But 16 percent informed me that such activities were taken over by other agencies. They were the recipients of a certificate, not the instigator. Wise emergency managers, however, used this strategy effectively. Usually they were behind the scenes thereby focusing attention on others rather than self.

> "We are in the planning stages right now of another aspect of this. We will have a community recognition day on the one year anniversary of the tornado. We did this a few years back when we had a flood. These things seem to be appreciated and kind of help people see how they have recovered and reminds them of the helpers."

> "Yes, I wrote a letter that I had co-signed by the Mayor and the County Judge. I got those sent to everyone who worked on the tornado. A group of us worked with the Mayor to identify a few who really were heroes and he presented them

with a key to the city. And then, on my own, this office compiled a list of every company and individual that had contributed in some way to the response. I put a large ad in the local paper thanking these people for their assistance."

Conclusions

Five general conclusions flow from this assessment. Let's examine each briefly.

1. *Local emergency managers must approach their work within a strategic perspective.* Confronting the daily routines *and* especially during disaster responses, local emergency managers must maintain an image of "the big picture." And they must be prepared and capable to help representatives from other local agencies to do likewise. These agencies, which collectively will comprise an emergent multiorganizational network when disaster strikes, can function in a more coordinated manner if selected preparedness activities have been implemented. Many of these can be nurtured and facilitated through the use of specific managerial strategies by the local emergency manager, including constituency support, agenda control, use of outside experts, and the like (for elaboration see Drabek 1990). Through tenacious use of these strategies interagency relationships can be nurtured that reflect high levels of trust. When operative prior to disaster, these social bonds can be guided and modified by a series of coordination strategies that facilitate the emergence of a multiorganizational network that can effectively meet the demands produced by any disaster.

2. *The typology of strategy developed by Osborne and Plastrik (1998) is a relevant and useful paradigm of strategic choice.* Five broad categories of strategy were validated through post-disaster interviews with a broad based sample of local emergency managers. Specific strategies and tactics were used by these managers. Through interviews they easily illustrated these which collectively validated the five broad types identified by Osborne and Plastrik (1998). That is, what they called "the five Cs": 1. care, 2. consequence, 3. customer, 4. control, and 5. cultural. The understanding and use of these was mixed within the study sample, however.

3. *Training of local emergency managers must be modified to emphasize a strategic perspective.* As this profession continues to evolve, more attention must be directed toward the range, frequency, and depth of training available and implemented. No single academic discipline provides the intellectual foundation and breadth required. Initially, this means that university based programs must be multidisciplinary in content and faculty. Over time, however, it is likely that the profession will evolve with more clearly defined boundaries and its unique intellectual and theoretical foundation thereby solidifying a distinctive identity. Given the range of hazards that confront any community, including various forms of terrorism, this profession always will require "generalists" who have the capacity to locate, learn from, and integrate relevant technical experts and materials originating within a broad range of scientific disciplines.

4. *Future disasters can provide invaluable information, insights, and perspectives if perishable data are collected, analyzed and reported.* Disasters will occur, but the national capacity to ensure that relevant data are collected in a timely manner is woefully inadequate. The rise of a small number of social science oriented research centers that are focused on hazards and disasters has been an important first step, but it is only a minimal start. As universities have responded to FEMA's Higher Education Initiative (Blanchard 1995), new education programs have been initiated, including undergraduate and graduate certificate and degree studies. Faculty to support these programs are in short supply and absorb the minimal research capacity that exists presently. The implication is obvious. The nation will remain at current risk levels until there is an appropriate infusion of resources.

5. *An enhanced knowledge base reflecting theoretically guided data collections and analyses is a required imperative for the evolution of the emergency management profession.* Without a continuing infusion of specialized knowledge that reflects relevant theoretical foundations, no profession can survive. Emergency management is no exception. While disaster responses to events reflecting the full range of potential hazards and risks must be an important part of the future research agenda, the full life cycle must remain the focus. This means that studies of mitigation, response, recovery, and preparedness must also be incorporated into theoretical and empirically driven analyses. Through these local emergency managers of the future can reflect a new vision of their profession and help others in their community better understand and accept the unique contribution they make toward the conquering of disaster.

Bibliography

Aguirre, Benigno E., Dennis Wenger, and Gabriela Vigo. 1998. "A Test of the Emergent Norm Theory of Collective Behavior." *Sociological Forum* 13:301-320.

Barton, Allen H. 1969. *Communities in Disaster: A Sociological Analysis of Collective Stress Situations.* Garden City, New York: Doubleday and Company, Inc.

Blanchard, B. Wayne. 1995. *Outline of a Potential Academic Emergency Management Curriculum and Related Courses.* Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Burton, Ian, Robert W. Kates, and Gilbert F. White. 1993. *The Environment as Hazard.* New York: The Gilford Press.

Drabek, Thomas E. 1985. "Managing the Emergency Response." *Public Administration Review* 45:85-92

Drabek, Thomas E. 1986. Human System Responses to Disaster: An Inventory of Sociological Findings. New York: Springer-Verlag.

Drabek, Thomas E. 1987. *The Professional Emergency Manager: Structures and Strategies for Success.* Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Drabek, Thomas E. 1990. *Emergency Management: Strategies for Maintaining Organizational Integrity.* New York: Springer-Verlag.

Drabek, Thomas E. 1991. *Microcomputers in Emergency Management: Implementation of Computer Technology.* Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Drabek, Thomas E. 1994. *Disaster Evacuation and the Tourist Industry.* Boulder, Colorado: Institute of Behavioral Sciences, University of Colorado.

Drabek, Thomas E. 1996a. *Disaster Evacuation Behavior: Tourists and Other Transients.* Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Drabek, Thomas E. 1996b. *Social Dimensions of Disaster: Instructor Guide.* Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Drabek, Thomas E. 1999. *Disaster-Induced Employee Evacuation.* Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Drabek, Thomas E. In Press. *Strategies for Coordinating Disaster Responses.* Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Drabek, Thomas E. and Chuck Y. Gee. 2000. *Emergency Management Principles and Application for Tourism, Hospitality, and Travel Management Industries: Instructor Guide.* Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Drabek, Thomas E. and J. Eugene Haas. 1974. *Understanding Complex Organizations.* Dubuque, Iowa: Wm. C. Brown Company.

Drabek, Thomas E. and Gerard J. Hoetmer (eds.) 1991. *Emergency Management: Principles and Practice for Local Government.* Washington, DC: International City Management Association.

Dynes, Russell R. 1970. *Organized Behavior in Disaster.* Lexington, Massachusetts: Heath Lexington Books.

Dynes, Russell R., E.L. Quarantelli, and Gary A. Kreps. 1972. *A Perspective on Disaster Planning.* Columbus, Ohio: Disaster Research Center, The Ohio State University.

Emergency Management Institute. 1995. *EOC's Management and Operations Course: Independent Study Course.* Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Emergency Management Institute. 1998. *Incident Command System: Independent Study Course.* Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Fischer, Henry W., III. 1998. *Response to Disaster.* Lanham, Maryland: University Press of America, Inc.

Fritz, Charles E. 1961. "Disasters." Pps. 651-694 in *Contemporary Social Problems*, Robert K. Merton and Robert A. Nisbet (eds.). New York: Harcourt.

Gillespie, David F., Richard A. Colignon, Mahasweta M. Banerjee, Susan A. Morty, and Mary Rogge. 1993. *Partnerships for Community Preparedness*. Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

Granot, Hayim. 1997. "Emergency Inter-organizational Relationships." *Disaster Prevention and Management: An International Journal* 6:305-310.

Gruntfest, Eve and Marc Weber. 1998. "Internet and Emergency Management: Prospects for the Future." *International Journal of Mass Emergencies and Disasters* 16:55-72.

Haas, J. Eugene and Thomas E. Drabek. 1973. *Complex Organizations: A Sociological Perspective*. New York: The Macmillan Company.

Hooper, Michael K. 1999. "Disaster Preparedness: An Analysis of Public Safety Agency and Community Preparedness During the Northridge Earthquake." *International Journal of Public Administration* 22:679-710.

Kreps, Gary A. 1991. "Organizing for Emergency Management." Pps. 30-54 in *Emergency Management: Principles and Practice for Local Government*. Thomas E. Drabek and Gerard J. Hoetmer (eds.). Washington, D.C.: International City Managers Association.

Kuban, Ron. 1993. "Crisis Management: Analysis of the Management of Communal Catastrophies." Ph.D. Thesis. Edmonton, Alberta, Canada: University of Alberta.

Lerner, Ken, Mary Beth Vasco and George Yantosik. 2000. "Use of Inter-Agency Agreements to Enhance Emergency Preparedness." *The Journal of the American Society of Professional Emergency Planners* 7:67-76.

McEntire, David A. 2001. "Multi-organizational Coordination During the Response to the March 28, 2000, Fort Worth Tornado: An Assessment of Constraining and Contributing Factors." (Quick Response Report #143). Boulder, Colorado: Natural Hazards Research and Applications Information Center.

Mileti, Dennis S. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Washington, D.C.: Joseph Henry Press.

Osborne, David and Peter Plastrik. 1998. *Banishing Bureaucracy: The Five Strategies for Reinventing Government*. New York: Plume.

Peacock, Walter Gillis, Betty Hearn Morrow and Hugh Gladwin (eds.). 1997. *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. London and New York: Routledge.

Perry, Ronald W. 1985. *Comprehensive Emergency Management*. Greenwich, Connecticut: Jai Press.

Perry, Ronald W. 1991. "Managing Disaster Response Operations." Pps. 201-223 in *Emergency Management: Principles and Practice for Local Government*, Thomas E. Drabek and Gerard J. Hoetmer (eds.). Washington, D.C.: International City Managers Association.

Quarantelli, E. L. and Russell R. Dynes. 1972. "When Disaster Strikes (It Isn't Much Like What You've Heard and Read About)". *Psychology Today* 5:66-70.

Scanlon, T. Joseph. 1994. "The Role of EOCs in Emergency Management: A Comparison of American and Canadian Experience." *International Journal of Mass Emergencies and Disasters* 12:51-75.

Sorensen, John H., Barbara M. Vogt, and Dennis S. Mileti. 1987. *Evacuation: An Assessment of Planning and Research.* Oak Ridge, Tennessee: Oak Ridge National Laboratory.

Taylor, James B., Louis A. Zurcher, and William H. Key. 1970. *Tornado: A Community Responds to Disaster.* Seattle: University of Washington Press.

Thompson, James D. and Robert W. Hawkes. 1962. "Disaster, Community Organization and Administrative Process." Pps. 268-300 in *Man and Society in Disaster,* George W. Baker and Dwight W. Chapman (eds.). New York: Basic Books.

Turner, Ralph H. and Lewis M. Killian. 1972. *Collective Behavior.* Englewood Cliffs, New Jersey: Prentice-Hall.

Wenger, Dennis E., E.L. Quarantelli, and Russell R. Dynes. 1987. "Disaster Analysis: Emergency Management Offices and Arrangements." Final Report on Phase I. Newark, Delaware: Disaster Research Center, University of Delaware.

Wolensky, Robert P and Edward J. Miller. 1981. "The Everyday Versus the Disaster Role of Local Officials—Citizen and Official Definitions." *Urban Affairs Quarterly* 16:483-504.

The Role of Advanced Technology in Disaster Response: Observations and Practitioner Issues

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Introduction

While the events of September 11, 2001, heightened awareness with respect to disaster response, the issue itself has been topic of a great deal of research. The dominant paradigm, based first on a disaster recovery model proposed by Haas, Kates and Bowden (1977), and further refined by Rubin (1979) and others since, describes a "cycle" for natural hazards events, composed of a series of stages: mitigation, preparedness, response, and recovery. In the mitigation and preparedness phases there are a mix of disciplines at work. Social science researchers have focused on the behavioral processes as societies make adjustments to living with hazardous and risk prone areas. These studies examine either individual psychological and personality response (Wenger, et al, 1975; Simpson-Housley and deMann 1987) or more generally the collective response activity of communities (Barton 1969; Dynes 1970; Perry and Lindell 1990).

As disaster research has become more specialized, particular phases of the hazard cycle have been the focus of research. For example, the public administration field has looked more closely at how the immediate response to disaster takes place, and how local governments can be more efficient in the service delivery of relief (Comfort 1988; Waugh and John 1990; Drabek and Hoetmer 1991). For those hazards with known lead times and associated warning systems, studies have focused on the ability of local governments to effectively alert and evacuate populations at risk (Perry and Greene 1983; Perry and Mushkatel 1984; Quarantelli 1984). For activities following the immediate response efforts, the available research decreases. The first comprehensive look at reconstruction of disaster-stricken communities emerged in 1977 with Haas, Kates, and Bowden, and was built upon by Rubin in her case studies of communities recovering from disasters (Rubin 1979, Rubin, et al. 1985), among others.

The more technical professions have focused primarily on engineering solutions: how to make things stronger, more resistant and safer to protect lives and property loss. Recovery and reconstruction has been more about restoration of services, but also with the hope of improving the structures and systems to withstand the next disaster. The response phase has traditionally been focused on the emergency management process and related issues, such as response times, search and rescue, putting fires out, stabilizing and transporting the wounded and similar activity. In the last several years, however, as technology has advanced there have been opportunities to improve the response capabilities and potentially save more lives. In the next sections, examples of these technologies are identified, followed by a discussion of the barriers and incentives that exist for the increased utilization in disaster events.

The Role of Technology

As an illustration, assume that a community has just experienced a disaster. It could have been from any of the following: flooding, a hurricane, a tornado, an earthquake or aftershock, fire, or maybe a technologically induced disaster involving deadly chemicals. As emergency response and recovery teams mobilize and approach the scene they have a need to gather, analyze, and relay information. The information is crucial in providing a clear picture of what disaster has taken (or is taking) place, how intense, scenarios of what might happen next, how many citizens are directly and indirectly affected, the best route to the disaster, and all the possible plans for dealing with response. Given limited resources of any community, the information and assessment process is a vital in assuring that resource allocation decisions are maximized to save the most lives, and secondarily, prevent additional property losses.

Prior to the arrival of mobile computing and cell phone technology, first responders on the scene had, at best, radio communication to relay information. That information was relayed to the Emergency Operations Center (EOC), where a response team had gathered to receive reports and make response decisions. The information was observed by a person on-scene, and then relayed verbally. Because of the nature of disasters, there is often confusion, conflicting reports, and almost universally more needs to address than there are capabilities. Using more advanced technologies, responders can better assess the extent of the event, and make more informed decisions about how to allocate limited resources. There are a variety of new hardware and software applications, communications equipment, and databases that improve the ability to collect, assimilate, and distribute this information. As illustrations, we identify several examples of how advances in software and hardware have increased the quality and amount of information available for disaster response activity.

Geospatial Tools

The technological applications that seem to have the most impact are those tools that utilize geo-spatial information that can be geo-coded and integrated with other database and flat file data. The use of Geographic Information Systems (GIS) in general have been on the rise in the field of urban planning, public works and related disciplines. The application to disaster response, however, has been slower in coming. As computing speeds have increased and as the GIS systems become more ubiquitous, more specific applications have been developed to address the needs of emergency responders.

Applications of Geographic Information Systems (GIS)
The technology of GIS is particularly well suited to post disaster response needs. The systems allow the visualization and integration of large amounts of data, and then enable the users to analyze and convey that information in ways that are more comprehensible and useful to the responders and decision makers. As an example of the increased use of the technology, the 20 state and federal National Interagency Incident Management Teams based in California now deploy to a disaster with a GIS specialist as part of the team (Greene 2002).

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One of the earliest applications of GIS in a response situation was the on-site (and ad hoc) adaptation of a GIS system in the San Francisco Bay Area following the Loma Prieta Earthquake of 1989. The collapse of the two-tier Nimitz expressway resulted in numerous crushed vehicles. A GIS system was used to pinpoint the location of each vehicle and assist the response team in the rescue and extraction process.

A more recent example of GIS used in response took place in New York after the collapse of the World Trade Center. Under the direction of the Federal Emergency Management Agency (FEMA) and the New York City Fire Department, GIS was used to map the debris pile and assist rescuers in the effort to search for survivors. Several critically important map layers were combined. The first was a high-resolution orthophotograph made within the past several years that was used as the base map (called NYCMap). Layered on that were two other maps, one being the floor plans and engineering plans of the WTC complex and underground mall, and the second set a range of images obtained through remote sensing (LANDSAT and flyover LIDAR). See Figure 1.
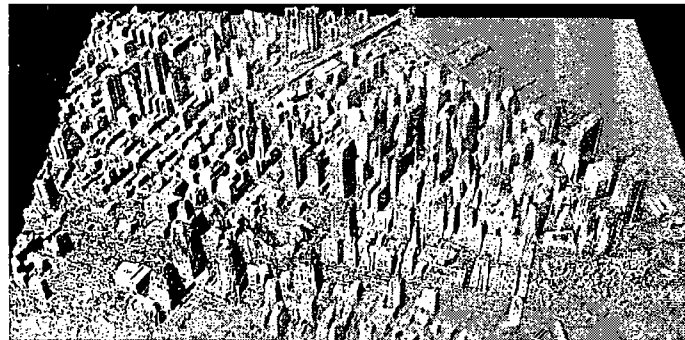
Figure 1: LIDAR image of the World Trade Center shortly after the collapse (Image Credit: NOAA/U.S. Army JPSD 2001)

GIS was also used to produce field operation maps, simply designed, but critical for orienting rescue personnel who were arriving from all over the U.S., and not familiar with the site—unrecognizable even to those who were.

Geographic Information Systems, when combined with the highly accurate Global Positioning Satellite (GPS) system technology, enable in-field responders to quickly and very accurately pinpoint the exact location of scene elements, such as the location of a gas main break, fires, trapped victims, and similar crisis conditions. Recent advances in this technology have enabled handheld applications through phone enabled PDAs- which means the data can be transmitted instantaneously to a response center (assuming the cell system is operational).

A more recent example of geo-spatial applications is a system called the Dialogue-Assisted Visual Environment for Geoinformation (DAVE-G), which allows users to interact with a large map via voice and gesture commands (Brewer 2002). This research project seeks to make interactive real time dialog possible to obtain and query critical on-scene information. The project, funded by the National Science Foundation, is in its final

year. It is not yet know if or when the system will be available commercially. A key element in the uniqueness of this system is the fact that the system allows emergency workers with little or no technical training to analyze a hazardous situation, develop a plan, and communicate that plan to emergency response teams.

A final example of a geo-spatial application is the "Rapid Responder." According to the developers, the product allows emergency responders, en route and on site using a laptop or other computer, to instantly access pre-determined safety plans, floor plans, staging areas, hazardous materials, collapse zones, utility shut-off locations, and photos for virtually all structures. This system also allows communication of response information nationally, regionally, and locally. As described on their website:

> This incident management software permits multiple responding agencies the ability to pre-plan, coordinate and collaborate on-line to an incident or disaster. This tool, to a great degree, mitigates the communication gaps that occur during a large-scale event. In addition to the communications advantages, the product displays over 250 data points for facilities. (http://www.preparedresponse.com).

With data storage and mobile processing creating more workable and accessible systems, there is every indication more and more of these systems will become available. Whether they are implemented or not will depends on some of the issues in the discussion section below.

New Mapping and Hazard Location Initiatives

One of the crucial components of any technology focused on disaster response is the availability and accuracy of the mapping data. A recent effort under the direction of the Federal Emergency Management Agency, called the Multi-Hazard Mapping Initiative, is designed to update and digitize maps that indicate a range of hazards. The program will have many potential uses, as it is designed to allow agencies and users to locate, retrieve and utilize multi-hazard map data from many different organizations, regardless of the end user's platform. The program may reduce collection costs by allowing agencies to divide data collection responsibilities.

An example of using location and mapping information for informing disaster response decision making can be found in the recent development of a system called TriNet, for earthquake detection. TriNet is a cooperative effort of three agencies in Southern California: The California Institute of Technology (Caltech), the U.S. Geological Survey (USGS), and the California Geological Survey (CGS). Using over 200 strong motion detectors arrayed in southern California, the TriNet system is capable of sending key data directly to command centers, within minutes of the event. As described on the TriNet website:

> TriNet is able to rapidly advise the media, government agencies, disaster response teams, and the utilities so that informed decisions may

be made as to where to dispatch personnel and equipment after a damaging earthquake

The site goes on to describe how a typical event might be processed:

> Signals from the seismic stations are transmitted to the central processing facility at Caltech via digital phone lines (frame relay), radios, microwave links, and the Internet. The seismic data are analyzed immediately to answer the important questions: Where did the earthquake occur? How big was it? What was the distribution of shaking? What fault did it occur on? What was the type of faulting? The information will then be available through the Internet and sent directly to cost-sharing partners through a commercial paging system or a secure Intranet. (http://www.trinet.org)

One other example of technological advances with respect to locational issues and tracking is found in the "Earth Alert" system, recently announced by NASA and 3e Technologies International in 2002. The Earth Alert system alerts emergency management agencies within a specific area, or the system can alert a specific agency nationwide of a natural or technologically induced disaster. The Earth Alert signals the appropriate agency for the disaster and then that agency then takes full command of implementing the plan, responding to the site, and organizing other agencies serving a support role. With Earth Alert's ability to track emergency response vehicles and individuals, a command center can know the location of vehicles and personnel, and the estimated time of arrival (ETA) for equipment and resources to the location; allowing for a flexible plan in getting emergency workers to the scene quickly. Having visually available real-time tracking information available to the command center has the potential to enhance the quality of decision-making, and will assist in the difficult decisions of limited resource allocation.

Discussion

The technological advances briefly illustrated here as applied to disaster response indicate that there are many more potential applications and uses that will greatly enhance the capability of communities and emergency responders. The ability to place this technology into the hands of field response personnel and to effectively integrate it with IT infrastructure of any given community will encounter several issues that are discussed here. The five key elements are cost; training; "shelf-life," implementation, and integration.

Cost

Technology is not cheap. While the cost of computing in general has gone down, and the available computing power increased, the newer mobile applications (wireless, GPS, and handheld solutions) are still fairly expensive. To equip a large fire department with a technologically advanced system requires a large investment on the part of the community. Unless there is a clear and defensible reason to implement the system, most communities find it difficult to raise funds to cover "high-tech" equipment, particularly if

they are struggling with budget cutbacks and the need to maintain existing equipment. Even mapping systems are expensive beyond just the acquisition of the equipment, as it requires maintenance and updating of accurate data. Cost issues are also tied to the next item, training.

Training
Training is as much as an investment in a system as the upfront capital costs, or more. Without appropriate training, the system will be underutilized at best, and at worst will not be used at all. Training is expensive and ongoing, as there is turnover in staffing in the response units. In some cases, new positions would have to be created, as most fire and emergency response personnel do not enter service with the computer and data analytical skills that are often required to understand and apply the information in these systems.

"Shelf life"
As with any software or hardware system, obsolescence is a key concern for public officials who decide to invest in a large-scale system. Before investing, community leaders will want to know how long the system will serve the community, how reliable is the vendor, and how much updating will be required along the way. Many cities experienced the problems of migrating from mainframe to desktop and that memory is still fresh in many administrators' minds.

Implementation
In addition to the cost and training issues identified above, there is the issue of implementation. Many of these systems assume that there is a sophisticated information Technology (IT) infrastructure in place in the community already. For many communities this is not true. Even if the community sees a product they believe will be useful, it may be that the overall IT infrastructure needs to be upgraded to support the additional capability.

Integration
Newer technologies must still be integrated with existing data in the community and existing practices. Without dedication from management and appropriate financial support to implement the system, the newer technologies will not achieve their projected usefulness. Older data may still be in paper form, or in databases that must have bridge software written to transfer the information.

Other issues that are not unique to disaster response, but are common to information technology, have to do with data sharing, data acquisition, and open sourcing of software. Vendors creating these systems are trying to stay in business. The investment required to create an operational system means that either the cost will be high for the product, or a government agency must provide the R&D funding.

Conclusion

High Tech solutions to response and recovery problems seem enticing to many emergency managers because of the potential to improve response capabilities in their

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community. Technological fixes need to be carefully evaluated for their appropriateness in any given Emergency Management Office. Considerations of cost, training requirements, and longevity of the solution, not to mention the overall initial and ongoing maintenance costs must be part of the decision making process. As computing systems continue to become more powerful, their applications will eventually be fully integrated in the way emergency response takes place. The key for most communities will be to adopt only those technologies that are a proven value elsewhere and can be implemented effectively in the local emergency management system. Finally, it would be helpful to the practitioner profession of emergency management if research were conducted that evaluated the comparative effectiveness of these technologies, and offered an objective perspective on whether adoption of a new system is appropriate or worthwhile.

References

Amdahl, Gary. 2001. *Disaster Response: GIS for Public Safety*. Redlands: ESRI Press.

Barton, Allen H. 1969. *Communities in Disaster*. New York: Doubleday.

Brewer, I. 2002. "Cognitive Systems Engineering and GIScience: Lessons learned from a work domain analysis for the design of a collaborative, multimodal emergency management GIS." *Proceedings, GIScience 2002*, Boulder, CO, pp. 22-25.

Comfort, Louise K., ed. 1988. *Managing Disaster: Strategies and Policy Perspectives*. Durham, N.C.: Duke University Press.

Corbley, Kevin P., 1995. "South Florida fine-tunes GIS in hurricanes aftermath." *GIS World*, vol.8, no.9: 40-43.

Drabek, Thomas E. and Gerard J. Hoetmer, eds. 1991. *Emergency Management: Principles and Practice for Local Government*. Washington, D.C.; ICMA.

Dynes, Russell R. 1970. *Organized Behavior in Disaster*. Lexington, Mass: D.C. Heath and Co.

Greene, R.W. 2002. *Confronting Catastrophe: A GIS handbook*. Redlands: ESRI Press.

Haas, J. Eugene, Robert Kates, and Martyn Bowden. 1977. *Reconstruction Following Disaster*. Cambridge, MA.: MIT Press.

Hickey, Robert J., Bush, David M., and Boulay, Rachel S. 1997. "GIS supports coastal risk assessment." *GIS World*, vol.10, no.6: 54-58.

Kehlet, Robert A. 1995. All-hazards situation assessment program. Bridges: *Emergency Management Connections*, Summer: 26-28.

Perry, Ronald W. and Marjorie R. Greene. 1983. *Citizen Response to Volcanic Eruptions: The Case of Mt. St. Helens.* New York; Irvington Publishers, Inc.

Perry, Ronald W. and Alvin H. Mushkatel. 1984. *Disaster Management: Warning Response and Community Relocation.* Westport, Conn: Quorum Books

Perry, Ronald W. and Michael K. Lindell. 1990. "Predicting Long Term Adjustment to Volcano Hazard." *International Journal of Mass Emergencies and Disasters.* Vol. 8: 117-136.

Quarantelli, E.L. 1984. "Perceptions and Reactions to Emergency Warnings of Sudden Hazards." *Ekistics.* No.309, Nov./Dec. 1984: 511-515.

Rubin, Claire B. 1979. *Natural Disaster Recovery Planning for Local Public Officials.* Columbus, Ohio: Academy for Contemporary Problems.

Rubin, Claire B., et.al. 1985. *Community Recovery From a Natural Disaster.* Institute of Behavioral Science, Monograph #41. Boulder, Colorado: University of Colorado.

Simpson-Housley, Paul and A.F. de Mann. 1987. *The Psychology of Geographical Disasters.* Ontario: York University.

Speed, Vicki. 1994. "GIS and satellite imagery take center stage in Mississippi flood relief." *Geo Info Systems,* vol.4, no.1 (January): 40-43.

Waugh, W.L., Jr. and Ronald John, eds. 1990. *Handbook of Emergency Management: Programs and Policies Dealing with Major Hazards and Disasters.* New York: Greenwood Press.

Wenger, Dennis, James Dykes, Thomas Sebok, and Joan Neff. 1975. "It's a Matter of Myths: An Empirical Examination of Individual Insight into Disaster response." *Mass Emergencies.* Vol.1: 33-46.

Web Resources identified in text:

GIS and Disaster Response mapping: www.ESRI.com
Rapid Response: http://www.preparedresponse.com
Dialogue-Assisted Visual Environment for Geoinformation (DAVE_G): http://www.geovista.psu.edu/grants/nsf-itr/
Multi-Hazard Mapping Initiative: http://www.fema.gov/maps.shtm
TriNet: http://www.trinet.org
EarthAlert: www.nasa.gov

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"Unseen Vulnerable Children" in Disasters:
A NEW CHALLENGE FOR EMERGENCY MANAGERS

Behavioral Changes and Mental Health Issues among Child Victims

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BACKGROUND

The premise and thesis of this article are based on a relevant portion of Senator Hillary Clinton's legislation (Bio-Terrorism Bill – S. 1539 – Protecting America's Children Against Terrorism Act), which contains several requirements for bio-terrorism planning focused on children. (For detailed information about the bill, visit www.gvc-disater.com/S.1539).

According to the American Academy of Pediatrics (AAP), a Washington DC press release, dated May 23, 2002, titled " BIOTERRORISM BILL FILLS GAPS IN PROVIDING CARE TO CHILDREN," stated that the bill passed by Congress would help alleviate some of the gaps in the health care system when it comes to providing care to children after a disaster. "The physiological and psychological differences between children and adults are complex and profound. Children's lives would be placed at needless risk if our preparedness efforts did not plan for these differences," said AAP President Louis Z. Cooper, MD. "This legislation is critical to fixing some of the current problems and to improving our ability to care for children following a terrorist attack or other emergency." The legislative mandates are as follows:

- Establishes a National Advisory Committee on Children and Terrorism to ensure that the country's health care and mental health services are prepared to meet the needs of children;
- Requires that the national stockpile of medical supplies, equipment, drugs and vaccines provide for the emergency health needs of children;
- Establishes pediatric education and training programs for all health care personnel;
- Includes children's hospitals in all preparedness efforts;
- Requires that the newly established interagency working group on bio-terrorism address the health needs of children; and
- Allows states to use federal grants to address the health needs of children in emergencies.

President George W. Bush also established the President's New Freedom Commission on Mental Health in April 2002 as part of his commitment to eliminate inequality for Americans with disabilities. The President directed the Commission to identify policies that could be implemented by federal, state and local governments to maximize the utility of existing resources, improve coordination of treatments and services, and promote

successful community integration for adults with a serious mental illness and children with a serious emotional disturbance.

THE STATE OF CHILDREN IN DISASTERS AND PEDIATRIC PREPAREDNESS

Disasters of all types are events that can result in severe and marked disruption of the social fabric of the community. Its citizen faces loss of property, injuries and in some instances, loss of lives. Disaster requires immediate, coordinated and effective response by multiple agencies from both the governmental and voluntary sectors to meet the medical, logistical and emotional needs and to promote recovery of the affected community.[1] Children, who may react to disasters in a variety of psychological, behavioral, emotional and physical ways, need particular attention from emergency planners and managers. These reactions can be affected by the level of development of the children, types of events, and responses from the parents and caregivers. Acts of terrorism will likely accentuate these reactions.[2]

CHILDREN REACT TO DISASTER DIFFERENTLY THAN ADULTS

There is a dangerously insufficient understanding of the specific needs and challenges of recognizing and responding to chemical, biological or nuclear weapons, as well as other disasters. Whatever has been done for adults to prepare for such attacks, far less has been done to create pediatric-specific support systems. Many important differences exist between adults and children exposed to chemical, biological or nuclear agents, which is why specific pediatric planning is required to ensure optimal management of children at risk:[3] For a complete list of how healthy children react to disasters differently than adults, go to www.gvc-disaster.com/reactions.

According to the American Academy of Pediatrics' "Children, Terrorism and Disasters,"[4] children are the youngest victims with more vulnerability than adults; children have unique treatment needs; and children have unique mental health needs. In the AAP article, *"The Youngest Victims: Disaster Preparedness to Meet Children's Needs"* children are more vulnerable than adults as follows:

- Children are vulnerable to aerosolized biological or chemical agents because they breathe more times per minute than adults; they would receive larger doses of

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[1] Crisis Counseling Guide to Children and Families in Disasters (2002), Publication from the New York State Office of Mental Health.

[2] Pfefferbaum B, Pfefferbaum RL, Gurwitch RH; Nagumalli S; Brandt EN; Robertson MJ; Aceska A; Saste VS: Children's Responses to Terrorism: A critical review of the literature (in process citation), Current Psychiatry Report Apr, 2003; 5(2): 95-100.

[3] According to Testimony before the Senate Committee on Health, Education, Labor, & Pensions Subcommittee on Children and Families presented by Joseph L. Wright, MD, MPH, FAAP on behalf of The American Academy Of Pediatrics, November 2, 2001.

[4] See www.aag.org/terrorism

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substances. Also, because some such agents (e.g. sarin and chlorine) are heavier than air, they accumulate close to the ground in the breathing zone of children.

- Children are more vulnerable to agents that act on or through the skin because their skin is thinner and they have a larger surface-to-mass ratio than adults.
- Children are more vulnerable to the effects of agents that produce vomiting or diarrhea because they have less fluid reserve than adults, increasing the risk of rapid dehydration.
- Children have smaller circulating blood volumes than adults do, without rapid intervention, relatively small amounts of blood loss can quickly tip the physiologic scale from reversible shock to profound, irreversible shock or death.
- Children have significant developmental vulnerabilities not shared by adults or infants, and young children do not have the motor skills to escape from the site of chemical, biological, or other terrorist incident. Even if they are able to walk, young children may not have the cognitive ability to figure out how to flee from danger or to follow direction from others.

CHILDREN HAVE AN INCREASED PHYSICAL VULNERABILITY TO MEDICAL CONDITIONS AND/OR RISK FOR ADVERSE PSYCHIATRIC CONSEQUENCES

- *A terrorism incident with physical exposures, such as chemical and biologic agents, could severely impact a child's emotional and physical state.*
- *All children with changed emotional and/or medical conditions or physical status are vulnerable to behavior emergencies.*

According to the Paramedic Teaching Resource for Instructors in Prehospital Pediatrics (TRIPP) curriculum, numerous medical conditions that present in a disaster, including diabetes, hypoglycemia, brain injury, meningitis, encephalitis, seizure disorders, hypoxia, and toxic ingestions, can manifest with signs and symptoms that suggest psychiatric illness. These symptoms include altered mental status, hallucinations, delusions, incoherent speech, and aggressive or aberrant behavior. These altered moods and behaviors are similar to children with mental illness.

Medical conditions, including toxic exposures, can cause physical changes in a child's body chemistry and functions and cause behavior patterns with emotional dysfunction. For example, nerve gases (such as sarin), in a terrorist chemical incident will cause medical conditions with behavior manifestations. Sarin could cause sweating, nausea, and confusion, side effects for medications used in the treatment of childhood mental illness. Co-existing and combined emotional/psychological and physical status changes could facilitate and perpetuate a behavioral emergency in a child. Emergency responders also need to be mindful of not attributing disturbances in behavior in these children to their psychiatric conditions solely, thus overlooking the inherent neuropsychiatric effects of chemical agents.

Whether considering adult or child, the quantified number of psychological casualties as

a result of a disaster usually exceeds the physical casualties.[5] The American Academy of Child and Adolescent Psychiatry (AACAP, 1998) suggests that a child's reaction to a disaster, such as a hurricane, flood, fire, or earthquake, depends upon how much destruction is experienced during or after the event. The death of family members or friends is the most traumatic, followed by loss of the family home, school, special pets, and the extent of damage to the community. The degree of impact on children is also influenced by the destruction they experience second hand through television and other sources of media reports.

The National Institute of Mental Health (NIMH), a component of the National Institutes of Health (NIH), the federal government's principal biomedical and behavioral research agency provides information on children impacted by disasters: "Reactions to trauma may appear immediately after the traumatic event or days and even weeks later. Loss of trust in adults and fear of the event occurring again are responses seen in many children and adolescents who have been exposed to traumatic events.[6] Reactions vary according to age. For details visit www.gvc-disaster.com/reactions.

For children with emotional and/or behavioral conditions their level of anxiety may be greater and they may have difficulties coping. Again, according to the Paramedic TRIPP Training program, psychiatric disorders can also present with the appearance of a medical problem, for example, a patient with an anxiety disorder may experience a panic attack, with hyperventilation, tachycardia, diaphoresis, chest pain, and other signs of a medical emergency.

IMPACT OF DISASTERS ON CHILDREN WITH UNDERLYING MENTAL ILLNESS: POTENTIAL FOR INSTABILITY AND QUIET SYMPTOMS EMERGING

There is significant ongoing research on disaster-related post-traumatic stress in children, especially from the impact of September 11th terrorist attacks witnessed first hand by many school children in New York City. Elaine Zimmer, Executive Director, Connecticut Commission on Children, ASI Children, Families and Health Committee, stated that more than 10, 000 children lost parents in the attacks in New York City, Virginia and Pennsylvania. Children were affected regardless of whether their parents were physically involved in the tragedies. The Connecticut Commission on Children collected children's artwork created in response to the terrorist attacks, a video "I Will Never Trust the Sky Again."

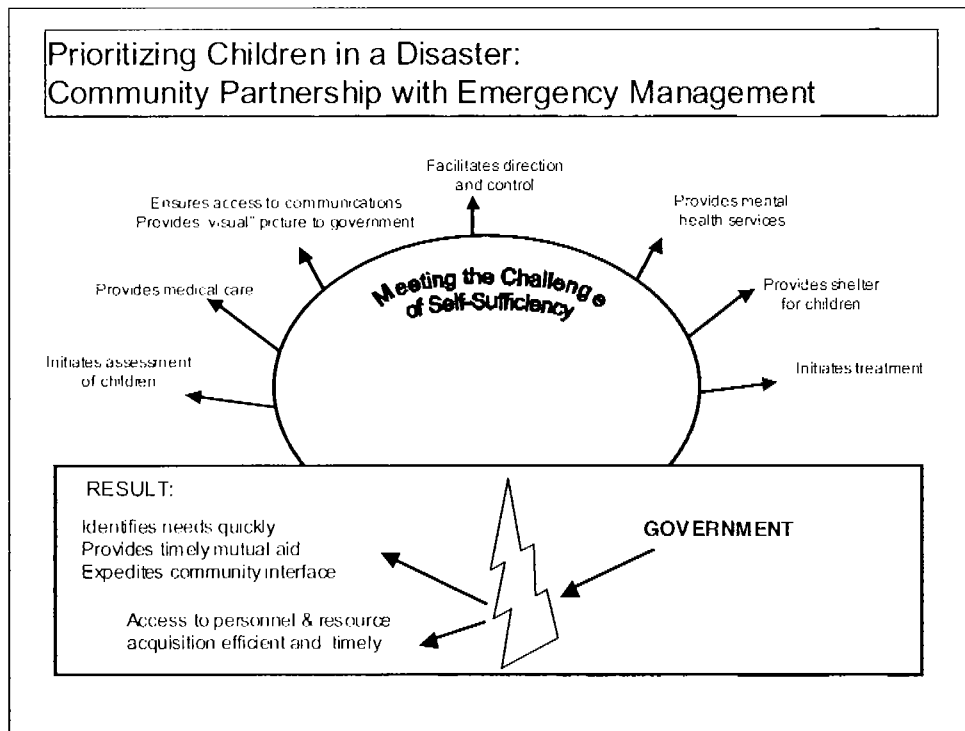Significant research exists on acute situational stress and post-traumatic stress in children, but little research exists on children with underlying emotional illness and the impact of disasters especially a bio-terrorism event. According to Katz at al. (2002), preexisting mood and anxiety disorders appear to place individual at increased risk of adverse

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[5] See http://www.dcchildrens.com/about/institutehandbook.pdf
[6] Ibid.

psychological consequences.[7] Persons with pre-disaster psychiatric histories were disproportionately likely to develop disaster-specific PTSD and to be diagnosed with some type of post-disaster disorder.

Prioritizing Children in a Disaster:
Community Partnership with Emergency Management

Facilitates direction and control

Ensures access to communications
Provides visual" picture to government

Provides mental health services

Provides medical care

Meeting the Challenge of Self-Sufficiency

Provides shelter for children

Initiates assessment of children

Initiates treatment

RESULT:

Identifies needs quickly
Provides timely mutual aid
Expedites community interface

Access to personnel & resource
acquisition efficient and timely

GOVERNMENT

While children with pre-existing mental health issues have many similar issues as other children in a disaster, additional issues make them more vulnerable and affected than children without these underlying mental health conditions. The impact of disaster is likely to be magnified if a child has been the victim of child abuse, been in a previous traumatic/disaster experience, has a mental health condition, and/or lacks family/community support. The degree of stress reaction and potential for a behavior emergency in a disaster event depends on both physical factors (*i.e.* metabolic, respiratory, neurologic, and cardiac) impacting the child, current mental health status, treatment variables (including stability on medications), and unique history (family dynamics and social support) of the child. According to the American Academy of Pediatrics, "*The Youngest Victims: Disaster Preparedness to Meet Children's Needs*," children are highly influenced by the emotional state of their caretakers. This article also reports that when the parents or other caretakers of a child are psychologically harmed by the events around them, it is likely to affect the psychological well being of the child. Further, the impacted caregiver in need of assistance will hide behind the obvious need of the child to get assistance, rather than seek it out for himself or herself.

According to the Paramedic TRIPP training program, a child with a history of mental

[7] Katz CL; Pellegrino L; Pandya A; Ng A; De Lisi LE: Research on Psychiatric Outcomes and interventions subsequent to disasters: a review of the literature. Psychiatry Research: July 2002: 110(3): 201-217).

illness may present with a situational or physical problem that is unrelated to the psychiatric history.

Make note of the following facts:

Fact: *In the U.S., one in 10 children and adolescents suffer from mental illness severe enough to cause some level of impairment.*[8]

Fact: *One million children in California will experience emotional or behavioral disorders and 150,000 children are served by California's public mental health system.*[9]

Fact: The rates of identification of children and youth with Severe Emotional Disturbance (SED) vary across racial, cultural, gender, and socioeconomic lines. Although African-American and white students represent 16 and 68 percent of the school age enrollment respectively, they represent 22 and 71 percent of the students classified as SED. On the other hand, Hispanic-Americans and Asian-Americans represent 12 and 3 percent of the school-aged population respectively, but only 6 and 1 percent of the students classified as SED. Data also suggest that students from low-socioeconomic backgrounds are over-represented and female students underrepresented among those identified with serious emotional disturbance.[10]

Fact: Approximately nine percent to 13 percent of children ages nine to 17 have a serious emotional disturbance with substantial functional impairment; and five percent to nine percent have a serious emotional disturbance with extreme functional impairment due to a mental illness.[11]

Fact: *Four of the ten leading causes of disability in the United States and other developed countries are mental disorders, which include major depression, bipolar disorder, schizophrenia, and obsessive-compulsive disorder.*[12]

According to the POLICY OPTIONS SUBCOMMITTEE ON CHILDREN AND FAMILY PROMOTING PRESERVING AND RESTORING CHILDREN'S MENTAL HEALTH February 5, 2003: "Mental health problems among children and adolescents constitute a public health crisis for our nation affecting an increasing number of children

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[8] Dr. Albert Zachik, in summarizing the report of the Surgeon General's Conference on Children's Mental Health, published in September 2000.

[9] Jim Mayer, in discussing a September 2001 report by the Little Hoover Commission, *Young Hearts and Minds: Making a Commitment to Children's Mental Health.*

[10] NATIONAL AGENDA FOR ACHIEVING BETTER RESULTS FOR CHILDREN AND YOUTH WITH SERIOUS EMOTIONAL DISTURBANCE, prepared by the Chesapeake Institute for the U.S. Department of Education Office of Special Education and Rehabilitative Services Office of Special Education Programs, September 1, 1994.

[11] National Alliance for the Mentally Ill.

[12] *Ibid.*

and youth, impact children and their families in all spheres of life, and result in costly and often tragic consequences [and this] nation has failed to adopt a comprehensive, systematic approach in response." The National Advisory Mental Health Council's Workgroup on Child and Adolescent Mental Health concluded, "No other illnesses damage so many children so seriously." The extent, severity, and far-reaching consequences of mental health problems in children and adolescents make it imperative that our nation adopt a comprehensive, systematic, public health approach to improving the mental health status of children. These findings have implications in a disaster response.

Parents will often, by nature, assign more significance to and priority on their children, often minimizing or disregarding their own needs. This can affect the allocation of resources in disaster response, especially in the area of bio-terrorism. For example, evacuation and relocation issues may be impacted if families cannot remain a cohesive unit or parents may, for example, refuse timely medical treatment, such as vaccination, until their children are treated first.

Children with preexisting emotional disabilities need to have a secure reliable "strong" link to and throughout the emergency planning process at all levels of government, public and the private sector with a continued open path for new information flow of on-going changing policy, mandates, resources, and relentless creative solutions.

The needs of children, especially those with underlying preexisting emotional conditions, should be adequately addressed prior to an emergency in order to minimize, diffuse and stabilize the adverse impact on them, their families and their communities. Emergency Managers need to make informed pivotal decisions for optimal use of available resources and personnel during disaster response with awareness of and consideration for all children.

A compelling unique planning challenge and consideration for Emergency Managers is a sub-category of children with potential for behavioral emergencies. With terrorism threats (a new disaster for this generation of emergency planners) and potential for multi and mass casualties and impacted isolated victims in communities, new planning contingencies need to be addressed for vulnerable populations especially children. These not easily identified and overlooked children with pre-existing or undiagnosed mental health and/or medical conditions/issues have potential for psychological consequences that may include behavior emergencies amongst other symptoms (i.e. depression and anxiety) and could pose a risk to themselves or others in the disaster response phase. This newly recognized hidden problem is especially compelling for Emergency Managers developing plans, training programs and caches for community response.

A new deliberate focus by Emergency Managers of this group is recommended to address the needs of this vulnerable population through enhanced disaster mitigation and planning, response, and recovery strategies. A new paradigm needs to be put forth to address children with underlying pre-disaster psychiatric conditions that may require a

more robust intervention from the disaster response community than just children with post traumatic stress and acute situational stress.

Proactive professional emergency management "macro-level" planning measures would include: building on existing disaster plans; creating new standard operating procedures and evaluation methodologies; facilitating innovative response strategies; training and exercises; initiating and forming partnerships, building child networks, and creating coalitions and advocacy groups; fostering new legislative mandates and policies; and ensuring a process exists to allow a new system and forum. The mental health strategy and plans for children need to evolve as new solutions and more research and information become available and emergency professionals should remain informed of these new changes in the field.

SPECIAL ISSUES OF CHILDREN WITH PSYCHIATRIC DISABILITY

The focus on children with mental health needs has broad ranging application to all other children and groups and consequently contributes to the effectiveness of Emergency Managers and their quality programs. The needs of the parents of these children may present as those of their children. Children with bipolar disorder, for example, raise issues and questions relevant to the role of Emergency Managers and the need for new solutions as addressed in Senator Clinton's bill. For example, children with this disorder may have a recurrence of their symptoms if they lack sleep. This could be caused by treatment interruption, displacement, or lack of shelter. The child's decompensating behavior may lead to diversion of potential first responder resources.

Bipolar Disorder is only one of many psychiatric diagnoses amongst children that highlight issues and questions, often encounter in other psychiatric conditions, relevant to the role of Emergency Managers and the need for new solutions as addressed in Senator Clinton's bill. Other children psychiatric diagnoses with potential implications for the disaster managers may include borderline, depression, anorexia, autism, oppositional-defiant disorder, obsessive-compulsive, attention deficit disorder, and schizophrenia with other complex medical conditions.

The characteristics and behaviors seen in children—further exacerbated if they have pre-existing psychiatric conditions—could include: demand for attention, withdrawal, escapist behaviors, agitated behaviors, uncontrollable rage, non-compliance, irritability, inability or difficulty in transitions, suicidal, and/or hallucination, could appear to be medically related symptoms. The child could be experiencing chemical imbalances in the mood centers of the brain which the child cannot control. Some of these children may have misperception and misinterpretation of event(s) that may not be consistent with the actual event(s), a point very important to be noted by Emergency Managers. Often these children are emotionally fragile (or vulnerable), loners that have difficulty in interpersonal social skills and have difficulty with transition. Some of these children are in special classes with specialized "one on one" programs.

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Some of these children require frequent medications, supervision, and professional psychiatric intervention in their daily life. For children receiving medications, close supervision by physicians is necessary due to potential side effects of those medications, such as nausea, headaches, as well as severe and even lethal interactions with certain medications or food. When medication changes are implemented, close supervision, observation and medical follow-up are needed to monitor potential drug reactions and to evaluate changes in behaviors. Environmental conditions that cause medical stresses, such as dehydration, illness (i.e., flu and fever), could exacerbate behavior problems and change the medication levels and consequent behavior effects. Some of these children require monitoring of blood toxicity levels routinely to evaluate risk for overdose or potential toxic effects. Some of these children may have restricted diets and receive daily medications several times per day with special fluid and food requirements. Consequences due to disruption of such treatment monitoring can be detrimental.

"A true pediatric behavioral emergency exists when the presenting problem includes some disorder of thought or behavior that is dangerous or disturbing to the child or to others. The child's behavior deviates from social norms and interferes with the child's well-being or ability to function." – Paramedic Tripp Training Curriculum

The identification and treatment of children with psychiatric problems—even without the undercurrent of a disaster—is a challenge and fraught with obstacles. If these children are unable to maintain or follow through with their treatment, which may include medication, their conditions may deteriorate, resulting in worsening depression, anxiety and if more severe, severe behavioral disruption, aggression, and even self injurious behaviors. The children who are undiagnosed may exhibit new and gradually worsening symptoms under the acute stress of the disaster with or without medications. Unlike other children with other types of disabilities, most of these children appear normal and intelligent, but have a condition only visible when brought on by tremendous stress, i.e., a disaster event.

During a disaster, these children are vulnerable to exacerbation of acute symptoms and behavior episodes as a result of sudden environmental changes. This is further increased when there are toxic chemical or biologic exposures, such as from a bio-terrorism event. Prior ongoing treatment for children with psychiatric disabilities will be adversely affected. For children receiving medication treatment, adverse effects may include the compromise of the therapeutic benefits of the medications. Identification of the medications and dosage schedules required for these children may not be available and the medications could be lost or available in insufficient and inadequate quantities. Disaster situations also may contribute to fluctuations in threshold levels from medications, not only adversely affecting the child's psychiatric conditions, but also increasing risks of potential toxicity and side effects in the child. The outcome of ineffective treatment could be magnified behaviors and unstable children.

While the role of medications is highlighted as an example above, it is important for the Emergency Managers to keep in mind that the concerns raised above apply equally to all forms of psychiatric interventions for children with psychiatric disabilities. And with limited resources and appropriate professionals, the unmet needs of these children and

their families could pose a strain on our communities and already limited disaster response resources of those communities.

For other potential issues that are relevant to the emergency planner, visit www.gvc-disaster.com/issues.

EARLY DISASTER CHILDHOOD INTERVENTION

All children are vulnerable to various adverse psychological problems as a result of experiencing a disaster. It can be difficult to distinguish children with preexisting mental health conditions from children with no known mental health conditions in a disaster experiencing acute situational stress. Especially with inadequate medical histories and care plans on children, first responders will be challenged in the intervention.[13]

Emergency Managers need to consider immediate first response interventions ahead of time during the development of comprehensive plans. To do such, Emergency Managers should engage child experts from the Department of Mental Health, the Board of Education, and other appropriate agencies serving the mental health needs of child constituents.

In general, different intervention strategies for children are necessary based on their age and development. These strategies may be further influenced by other specific characteristics of the child, including, but not limited to, culture, language, other special needs (psychiatric or medical), and level of social support. It is incumbent on Emergency Managers to realize and understand the wide spectrum of strategies and make available appropriate resources and personnel to support these intervention strategies.

For information on potential strategies and other recommendations,
visit .gvc-disaster.com/strategy, or refer to
http://www.dcchildrens.com/about/institutehandbook.pdf.

DISASTER PLANNING SOLUTIONS FOR CHILDREN: A NEW OPPORTUNITY FOR EMERGENCY MANAGERS

The disaster planning and response solutions warrant discussion and partnership with government agencies, community groups, schools, mental health organizations, hospitals, and social services. Increased community planning components that need to be emphasized and reinforced are evident in a new model programs. The Program for Pediatric Preparedness at The Children's Hospital at Montefiore is one such program. Dr. Irwin Relener, one of the country's leading authorities on the needs of children and disaster preparedness, recently left Montefiore to lead Columbia University's National Center for Preparedness at Columbia University's Mailman School of Public Health. There he will extend his insights on the special needs of children, particularly in the area

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[13] As mentioned at http://www.omh.state.ny.us/omhweb/crisis/crisiscounseling3.html

Planning for Children: Integrating Strategies

Children's Planning Epidemiology and Research
- Directed at medications
- Post disaster outcomes on children with underlying mental illness

Planning Partnerships and Networks
Access to information from state, regional, and local jurisdictions; directed at schools, mental health services, hospitals, transport providers, MOUs, stockpiles

Children's Integrated in Emergency Management:
Planning, Response
Recovery Operational Area EOCs

EOC Response Plan & SOP Enhancements
- Consistent with Homeland Security and Clinton Bill
- SEMS
- Alternate – Communication
- Information flow to local jurisdictions, regions, and states

Planning – Training and Evaluation
- Consistent with legislation
- Directed at Homeland Security
- Bio-terrorism policies and laws

of mental health.[14] Such programs can serve as a model, ultimately helping ensure the well being of many children if a terrorist or disaster-related calamity occurs:

- Identifying key staff and program leadership
- Establishing relevant external liaisons with city-wide planning agencies, other health care facilities, federal and state agencies, EMS and others
- Organizing a task force comprised of Health Department, Fire, Police and other key responders of relevance, such as the Board of Education and Department of Mental Health
- Developing protocols for early identification of hazards and their victims
- Acquiring relevant supplies and equipment
- Upgrading laboratory capabilities
- Development of appropriate facility plans to accommodate patient flow, creation of "clean areas," decontamination, and off-site patient care needs
- Conducting a facility-wide staff training program with regular full-scale drills; and,
- Creating guidelines and programs to deal with the psychological consequences of terrorism and disasters

The authors propose *a new model program* for children consistent with Senator Clinton's Bill needs to also include a network between community and government emergency management.

1. Identify optimal strategies for emergency management plans targeted at children in hospitals, residential treatment centers, clinics, and community "at large" setting and build on existing infrastructure, such as Primary Care, hospital, and mental health

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[14] See http://cpmcnet.columbia.edu/dept/sph/newsredlener.html

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associations, and utilize their expert recommendations in development of the project plan.

2. Develop templates for State, Regional, and Operational Area EOCs consistent with integrated Standardized Emergency Management System (SEMS). Develop school, hospital, and clinic emergency management plans in an "all hazards" approach to manage and respond to children in a bio-terrorism event.

3. Develop template policies and procedures for protecting children in terrorism events or other exposure events, such as basic, enhanced and recommended medications and mental health experts.

4. Develop protocols, policies and plans to increase Red Cross shelter, clinic, primary care, and casualty collection point capability and capacity during an emergency with an influx of large numbers of children victims with or without adult caregivers when hospitals are overwhelmed; develop procedures for schools, including special education programs.

5. Develop templates for disaster exercises, drills and tabletops for communities, including primary care clinic setting, integrating these exercises with the local and State community mental health, medical and health responders. Exercises/drills developed will be for internal and external events addressing an overwhelming influx of victims/patients with mental illness and behavior emergencies in the hospital and clinic setting, and will coordinate and integrate response with community emergency planning and response.

6. Identify mental health roles for community response teams, schools, and clinics in emergency events, including bio-terrorism and other outbreaks of infectious disease, and in other terrorism events. For example, provision of mass prophylaxis of children, staffing for alternative care sites, care for children with underlying mental illness.

7. Develop template policies and procedures to address the use of mental health and medical personnel or volunteers during an emergency. Addressing liability, worker's compensation, malpractice, Health Insurance Portability and Accountability Act (HIPAA), Disaster Service Worker status and other legal/ethical issues for personnel responding to a biological event.

8. The emergency management plans will include psychosocial considerations, including the provision of Rapid Assessment and Treatment of Children, Critical Incident Stress Management (CISM) and Critical Incident Stress Debriefing (CISD) for response personnel, their families and patients.

9. Conduct "train-the-trainer" sessions on the emergency management plans for children in state regions.

10. Develop risk communication strategies for children with the community clinic setting, integrating with community Emergency Managers to ensure consistent public messages and staff information.

11. Collaborate with the Federal, State, and Regional EMSA, Mental Health, Social Services, Departments of Rehabilitation, local Voluntary Organizations Active in

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Disaster (VOAD) and other identified organizations/groups in the development of the plan, and utilize this group as beta testers for the plan.

One potential partner organization is the Center for Effective Collaboration and Practice, which supports and promotes a reoriented national preparedness to foster the development and the adjustment of children with or at risk of developing serious emotional disturbance (SED). To achieve that goal, the Center is dedicated to a policy of collaboration at Federal, state, and local levels that contributes to and facilitates the production, exchange, and use of knowledge about effective practices. The Center is engaging in a series of strategic activities designed to help SED community members to develop a greater capacity to produce, access, and use information, and to collaborate. These activities are organized around four objectives to: (1) facilitate and to expand effective interagency collaboration; (2) identify and develop useful and useable information; (3) foster the exchange of such information; (4) evaluate the Center's activities. Their activities build upon a consumer-driven information needs assessment that identified the information needs of families, teachers, mental health practitioners, child welfare workers, and juvenile justice personnel. The authors recommend that Emergency Managers incorporate the Center's activities into disaster planning strategies:

- build on Federal efforts to improve collaboration and practice,
- address barriers to improving practice and sustaining collaboration,
- be driven by the needs of those who will use the information,
- focus on access to useful and useable information,
- link different knowledge communities in a sustained manner,
- employ effective communication strategies,
- address barriers to effective information use and exchange,
- align with, build upon and enhance the capacity of the Federal and state infrastructure that supports knowledge development and use, and
- reach out to historically marginalized groups, and possess the capacity for continuous self-examination and improvement.

According to the NATIONAL AGENDA FOR ACHIEVING BETTER RESULTS FOR CHILDREN AND YOUTH WITH SERIOUS EMOTIONAL DISTURBANCE,[15] local systems should remain school- and community-based so that they can respond to local needs and reflect the cultures of the communities they serve. Emergency Management Systems should be outcome-oriented, employ uniform definitions, provide individualized and family-centered services, and respond promptly, flexibly, and effectively during any crisis. Within a coordinated, collaborative system, services follow needs, and funds follow children and their families. Children and their families should be able to enter the entire system from any point at which specific services are first offered.

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[15] Prepared by the Chesapeake Institute for the U.S. Department of Education Office of Special Education and Rehabilitative Services Office of Special Education Programs September 1, 1994.

Other components, as applied within the appropriate four phases of emergency management, include (please see details at www.gvc-disaster.com/components):

1. Use of up-to-date "Registries" that track children and vital data (medication needs, storage locations, contacts, etc.). Ensuring confidentiality and consent for treatment information is necessary. Emergency planners should identify those in the community who might have special needs before, during and after a disaster or emergency and allocate appropriate funding, equipment, and staff.

2. Evaluate potential need for secure caches and stockpiles of childhood psychiatric medication at strategic locations under secure auspice.

3. Incorporate Disaster Response and Recovery Plan components addressing Special Need Children with inclusion of multi-lingual, cultural, and social considerations.

4. Facilitate training and exercises, including tabletop exercises that will incorporate the potential implications of psychiatric emergences and mental health for disaster response teams. Create scenarios with special need children and their challenges.

5. Create collaborative multi-disciplinary, community partnerships, steering committees, advisory groups, or coalitions with inclusion of families of special need children, schools, daycare centers, mental health centers, and residential treatment programs to build and ensure children with special needs disaster planning components.

6. Network and participate with expert children mental health professionals and planners to advise community organizations, advocacy groups, and community response teams. Involve special need directors and teachers of special education in school districts, parent groups, mental health teams, hospitals with children specialties, behavioral care centers and research facilities, DMAT community response teams and government planners.

7. Create 24 hour mental health disaster response capability, including teams with experienced child advocates, professionals, and translators; evaluate potential for experienced mental health professionals and trained volunteers to supervise these children.

8. Facilitate and foster community education campaigns to focus on parents with these children to ensure identification, wallet emergency information cards with medication and diagnostic information, extra medication, and emergency contacts.

9. Facilitate curriculum development for first responders, EMTs, DMAT, Mental Health Teams, community emergency response teams, parent groups, and school districts on special need children. Focus on special assessments, interventions, treatments, etc.

10. Create and update emergency phone trees in schools, churches, synagogues, and daycare centers. Evaluate possibility to have this information linked with command centers.

11. Integrate Standardized Emergency Management System (SEMS) Operational Area Plans and local jurisdictions with the special needs community. A good example is Alameda County's Collaborating Agencies Responding to Disaster (CARD) program,

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which networks community-based organizations with government.[16] Incorporate the special needs child population into the following county-wide plans: Operational Area Plan, Incident Command System, Mutual Aid Plan, and Multiple Agency Coordination.

12. Provide provisions for children in all shelter caches, disaster kits, and emergency stockpiles that include items not usually thought of as necessary in disaster response, such as games, art supplies, musical instruments, CDs, cassettes, and books. An excellent resource for preschoolers is "*Happy Thoughts*," by Holly Scarabosio, a children's story about being afraid at night.[17]

13. Develop standard operating procedures for special children with psychiatric emergencies in shelters and staging areas. Include safety and security measures for special children with mental health and potential behavior emergencies.

14. Develop and provide evaluation tools and community teams to assess special children.

15. Involve the media and disaster communications in planning for the response of children with special needs. Prepare public information announcements targeted to children.

16. Ensure mental health intervention, such as CISD, is available for all first responders taking care of these children.

17. Strive to reestablish familiar preexisting service systems and networks for the special needs children as soon as possible to avoid prolonged retrauma and to promote recovery.

CONCLUSION

All children with either medical condition and/or chronic mental health illness are impacted in/by a disaster and may react with emotional and behavioral changes requiring immediate mental health intervention. In a disaster, all children should be assessed for psychological stresses, as well as possible behavior emergencies, that might manifest. Without adequate mental health resources, it is difficult to assist this vulnerable population and to assess effectively the child with preexisting mental health conditions from children experiencing acute situational stress, and especially those experiencing both.

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[16] CARD is a collation of community-based organizations serving seniors, people with disabilities, and others with special needs in Alameda County. In times of disaster, its agencies act in concert to provide a coordinated response to the emergency needs of vulnerable residents.

[17] This sing-along book can be ordered from Dandelion Productions, Sacramento, CA. To see more information or to download an order form, visit www.happythoughts.info

A Three Level Emergency Management Approach to Planning for Children

Provide Enhanced Local Capability Intensive Support

Coordinated, intensive, sustained, and culturally appropriate support

Operational Area or County Disaster Response Plans: Intervention

Create SOPS - Red Cross Shelters, Community Emergency Response Teams, Schools, Parks and Recreation;

Build a Planning Foundation – STATE, REGIONAL & LOCAL JURISDICTION TASK FORCE ON CHILDREN AND BIOTERRORISM (Supports National Task Force)

Support federal plans and initiatives

All children are at risk in a disaster and fundamental disaster planning changes and enhancements must occur to ensure the appropriate resources are available in the planning, recovery, and response phases. The new quality disaster planning programs and response components for special need children need to evolve with the support of the emergency management community. Our goal is to embrace all of these children and facilitate their optimal safety, behavioral care, treatment and recovery in the midst of a challenging disaster response. Certainly, time spent of working some of these complex issues before a disaster for the target population outlined here will have broader application and might produce solutions that can be of benefit to the general population as well. Again, using the case study selected, this paper offers some possible solutions, but raises questions in an attempt to begin a constructive dialog about pediatric populations with disabilities and the need for consideration by the emergency management community.

RECOMMENDED READINGS AND RESOURCES

Publications and Web Sites:

The Emergency Preparedness Initiative at http://ww.nod.org/pdffiles/epi2002.pdf provides supporting information and recommendations in their Guide on the Special Needs of People with Disabilities.

The Western New York Rural Mental Health Partnership funded by a grant from the John R. Oishei Foundation prepared a Police Guide for Responding to Youth with Mental Health Needs. http://www.communityalliance.org/policepocketguide.doc.

The United States Department of Transportation National Highway Traffic Safety Administration has a first response Paramedic National Standard Curriculum http://www.nhtsa.dot.gov/people/injury/ems, which includes a module on behavioral and psychiatric disorders. The Paramedic TRIPP program includes curriculum on children with special health care needs.

Demitri and Janice Papolos, have a site addressing the needs of bipolar children at http://www.bipolarchild.com/; http://www.bpkids.org/learning/about.htm.

National Emergency Medical Services for Children (EMSC) at http://www.ems-c.org/ is a national initiative designed to reduce child and youth disability and death due to severe illness and injury. When prevention fails, the goal is to ensure that all ill or injured children and adolescents, with or without disabilities, receive state-of-the-art emergency medical care.

Joshi, Paramjit, MD, Lewin, Shulamit, MHS and O'Donnell, Deborah, PhD. The Handbook of Frequently Asked Questions Following Traumatic Events: Violence, Disasters, and Terrorism, 2002.

Child and Adolescent Research Consortium
Children's Mental Health Foundations and Agencies Network (FAN)
Blueprint for Change: Research on Child and Adolescent Mental Health

Surgeon General Reports
- "Children and Mental Health," Chapter Three from Mental Health: Report of the Surgeon General.
- Report of the Surgeon General's Conference on Children's Mental Health: A National Action Agenda.

www.aacap.org
www.aap.org
www.redcross.org
http://www.dcchildrens.com/about/institutehandbook.pdf
www.mentalhealth.org
www.nvoad.org
www.psych.org/disasterpsych
http://www.nimh.nih.gov/publicat/violence.cfm#viol2

Presentations:
"Children and Weapons of Mass Effect: A Disproportionate Danger," by Paul Rega MD, F.A.C.E.P. and Kelly Burkholder-Allen RN, MPH

Legislation and Bills:

H.R.3106 : To protect children from terrorism.
Sponsor: Rep Slaughter, Louise McIntosh
Latest Major Action: 10/29/2001 Referred to House subcommittee
Committees: House Energy and Commerce; House Education and the Workforce; House Transportation and Infrastructure

Protecting America's Children Against Terrorism Act (Introduced in Senate), S 1539 IS 107th CONGRESS, 1st Session, S. 1539 To protect children from terrorism, IN THE SENATE OF THE UNITED STATES, October 11, 2001.

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A National Training Standard for First Responders
A Look Into The Need For A National Training Standard For Local, State, Federal And Military First Responders

Thomas A. Ball

Introduction

The attacks of September 11, 2001 brought home the fact that the United States is vulnerable to terrorist attacks. The likelihood of an attack with weapons of mass destruction (WMD) using chemical, biological, radiological, and nuclear (CBRN) agents has increased. First responders from local, state, and federal agencies, and the military would conduct a coordinated response to a large-scale WMD attack with CBRN contaminants. To enable them to do this, a national training standard is needed for local, state, federal, and military first responder agencies so lives could potentially be saved when responding to a WMD incident. A national training standard would ensure a common jargon and common action-based competencies are used to conduct an efficient response to a WMD incident. This national training standard would form the basis for a coordinated response nation-wide that would potentially save lives by reducing response time and increasing response efficiencies. Further this training standard could be used to grade training exercises nation-wide.

Background

This paper will discuss: (1), why we should focus on local, state, federal, and military first responders, (2) the reasoning for a national training standard, and (3) what actions the standard should be based on.

In the war on terrorism it is commonly believed that it is only a question of time as to when terrorists will use a weapon of mass destruction with chemical, biological, nuclear, or radiological contaminants. Such an attack could entail a smuggled nuclear weapon or a chemical agent dispersed by a plane. A large-scale WMD incident would most likely involve local, state, federal, and military first responders to include Department of Defense hazardous material response units and fire departments.

First responders are generally considered to be the "police officers, fire-fighters, emergency medical providers, public works personnel, emergency management officials...specially trained hazardous materials teams, collapse search and rescue units, bomb squads, and tactical units" (Office of Homeland Security, 2002a, p. 41). There are approximately 10 million first responders in the United States and approximately 18,000 agencies at the local, state, and federal levels that employ first responders (J. Kish, personal communication, October 7, 2002). These myriads of agencies are at different levels of equipment, training, and competency. These different levels of competency may hinder a more efficient response to a WMD incident. An inefficient response could cause lives to be lost.

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Why Focus On A Local, State, Federal, and Military First Responders?

Now I wish to take a look why we should focus on local, state, federal and military first responders. As a WMD planner for the U.S. Army in Heidelberg, Germany, I found that in order to develop an executable WMD response plan I must coordinate between nine U.S. and Host Nation first responder agencies. Additionally U.S. military and Host Nation command structures are involved in the incident response. The list of agencies above does not include all the logistical and technical support agencies that support the first responders.

In the United States a large-scale WMD incident on or near a military post would most likely involve local, state, federal and military first responder agencies. Many military installations in the U.S. are currently pursuing memorandums of agreement or mutual support agreements with local and state agencies in order to adequately and rapidly respond to a WMD incident. Thus it is clear that the local, state, federal, and military first responders are all planning to conduct a coordinated response to a WMD incident in their area. This is some of the reasoning for focusing on developing a national training standard for these agencies.

Why A National Training Standard?

Many local fire departments, emergency management agencies, and military services have hazardous material (HAZMAT) response teams. The principles involved in responding to WMD incidents with CBRN contaminants (which should be based on action-based competencies) are the same for any type of HAZMAT unit, the scale of response differs. These response principles include: (1) identifying the hazard (2) determining the extent of the hazard area, (3) safeguarding response personnel and victims, (4) stopping the spread of the contaminant, and (5) decontaminating people, equipment, and facilities. It appears logical that a common training standard would enable first responders nation-wide to perform the same action-based competencies when responding to a WMD incident.

Webster's Ninth Collegiate Dictionary describes a standard as "something established by authority, custom, or general consent as a model or example" (Mish, 1990. p. 1148). To interpret this definition, "a model established by consent" makes sense when discussing a national training standard for first responders. Consensus on the content of the training standards among the first responder community would establish legitimacy within the community. This legitimacy would go a long way to acceptance and implementation of the standard.

Military and civil first responders have common objectives when responding to a WMD incident, such as reduce the effects of a hazard and preserve life. However, different factors such as organizational cultures, equipment, budgets, staffing levels, and even geographic locations (urban versus rural) effect what action-based competencies first responders train on and how they conduct training. "Today, many geographic areas have little or no capability to respond to a terrorist attack using weapons of mass destruction.

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Even the best prepared states and municipalities do not posses adequate resources to respond to the full range of terrorist threats we face" (Office of Homeland Security, 2002b, p. 42). Local first responders could potentially need first responder agencies from the state or federal level to augment their response to the incident. However, local authorities would potentially have the responsibility for directing the response. Without proper training authorities would not be able to coordinate an efficient response and this could potentially cause lives to be lost.

There is no one national professional association or organization that all first responders recognize as the umbrella organization to represent their interests or to establish standards of professional behavior. As such there are competing interests and no consensus on a set of standards. Examples of competing interests include conflicting incident command systems, no clear set of action-based competencies, and different regional emphasis on HAZMAT response priorities (i.e., Houston first responders might concentrate on chemical HAZMAT response while Three Mile Island first responders might concentrate on radiological HAZMAT response.

President Bush proposed the establishment of the Department of Homeland of Security. In regard to emergency preparedness and response one of the stated components of the National Vision detailed in the 2002 National Strategy For Homeland Security is ... "Our federal, state, and local governments would ensure that all response personnel and organizations – including the law enforcement, military, emergence response, health care, public works and environmental communities-are properly equipped, trained and exercised to respond to all terrorist threats and attacks in the United States" (Office of Homeland Security, 2002c, p. 44). It is further stated in the Strategy ... "The Department of Homeland Security would ensure the readiness of our first responders to work safely in an area where chemical, biological, radiological, or nuclear weapons have been used. The Department would begin requiring annual certification of first responder preparedness to handle and decontaminate any hazard. This certification process would also verify the ability of state and local first responders to work effectively with related federal support assets" (Office of Homeland Security, 2002b, p. 42). This annual certification process does not currently exist on a nation-wide basis.

Logically, one can conclude that these two statements all but require that a national training standard is needed for civil and military first responders. This standard would be the performance measure, or yardstick, used to train first responders to and grade training exercises against. If the myriad of first responder agencies in the United States can understand the same jargon and perform the same action-based competencies during an incident response, then they could potentially save lives. Reduced confusion among various first responder agencies would save time and increase incident response efficiency.

What Actions Should The Standard Be Based On?

1. The national training standard should be based on action-based competencies that first responders must perform during a response. Examples of these competencies include

identifying the hazard, determining the extent of the hazard, protecting personnel, reducing the hazard, and decontaminating personnel and equipment. The components of action-based competencies are knowledge, skills, and abilities (KSAs).

2. A national training standard must be part of everyday response (J. Dyar, personal communication. October 7, 2002). This is sensible. It can be successfully argued that if these training standards are not based on, and incorporated into, the everyday actions of first responders it is unlikely that first responders nation-wide would not buy into a standard.

The counter-argument is that a response to a WMD event is not an everyday occurrence. The intent of the argument is that first responders, incident command teams, and medical treatment personnel routinely train on and respond to hazardous material incidents. A WMD incident response is a matter of increased scale. The increased scale will probably require augmentation of local first responder agencies by any of thousands of outside first responder agencies. Thus, if outside agencies are called in to augment local first responders then the augmenters should perform the same action-based competencies in the same manner as the local first responders. If they perform these action-based competencies differently than local first responders, than they may be more of a hindrance to the over-all performance of the first responder team.

3. Action-based competencies should list individual tasks performed during an incident response (to include the steps that a person must perform to complete an individual task). These individual tasks should be grouped according to tasks that a team or group must perform (collective task). These collective tasks should then be grouped by essential tasks the entire team must perform. As an example, first list individual tasks such as: (1) properly don and use a self-contained breathing apparatus, (2) properly don and wear a Level-A protective suit, or (3) properly operate a chemical detector. These individual tasks would be linked to the collective task of: identify an unknown chemical contaminant. This collective task would then be grouped with other collective tasks such as (1) determine the hazard area from a chemical contaminant, (2) reduce the hazard from a chemical contaminant, (3) safeguard personnel in the hazard area for a chemical contaminant, and (4) decontaminate personnel, equipment, and facilities exposed to a chemical contaminant. These and other related collective tasks would be grouped under the heading of an essential task such as respond to an incident involving chemical contaminants.

This methodology is used by the military and is demonstrated in the training plan for a U.S. Army Civil Response Team (U.S. Army, 2002). It is a logical system because it building-block method that allows individual tasks to be identified and associated with several collective tasks. Thus, individuals can train on, and establish, their individual action-based competencies before they start training on more complex collective tasks. This allows for individual to build confidence in their abilities. Individual self-confidence can lead to team confidence and a more efficient response. This building-block system allows for a myriad of individual tasks to be identified, tracked, and trained. It also allows for training efficiency by training one individual task that can potentially be

used in several collective tasks.

Opposing Arguments

Arguments against a national standard fall into two camps. The first argument is that a national training standard can never be agreed upon or accepted by all involved. Since there are many first responder agencies in the nation, at first look this line of logic has validity. It is a daunting task. For example, if the Department of Homeland Security were to put out a standard that for whatever reason, first responders did not buy into; it would probably be ignored. The answer to this problem is that the members of the first responder units across the country have to want a standard and then buy into a standard. Such a standard will take a coordinated development effort between The Department of Homeland Security, Federal Agencies and the professional associations and organizations that represent first responders nation-wide. Current standards such as the National Fire Protection Association (NFPA) Standard 472 Standards For Professional Competence Of Responders To Hazardous Material Incidents and NFPA Standard 473 Standard for Competencies for [Emergency Medical Service] EMS Personnel Responding to Hazardous Materials Incidents standards could potentially be used as a basis for a national training standard.

The second argument within the first responder community is that there are too many equipment differences, different capabilities and different cultures to develop a standard by consensus. A solution would be to design the standards not to endorse or use a particular piece of equipment but to stick to describing the common steps that must be performed in the task. While this is not an optimal solution, it is a reasonable way of reaching consensus.

Conclusion

The attacks of September 11, 2001 brought home the fact that the United States is vulnerable to terrorist attacks. The likelihood of a WMD attack with CBRN agents is increased. First responders from local, state, and federal agencies, and the military are needed to conduct a coordinated response to a large-scale WMD attack with CBRN contaminants. A national training standard is needed for local, state, federal, and military first responder agencies in order to ensure that a common jargon and common action-based competencies are used to conduct an efficient response to a WMD incident. Further this training standard could be used to grade training exercises nation-wide. This national training standard would form the basis for a coordinated response nation wide that would potentially save lives by reducing response time and increasing response efficiencies.

REFERENCES

Office of Homeland Security. 2002a. **National Strategy For Homeland Security,** (pp. 40). Washington, D.C.

Office of Homeland Security. 2002b. **National Strategy For Homeland Security,** (pp. 42). Washington, D.C.

Office of Homeland Security. 2002c. **National Strategy For Homeland Security,** (pp. 44). Washington, D.C.

Mish, F. (Ed.). 1990. Webster's Ninth New Collegiate Dictionary. Springfield, Massachusetts: Merriam-Webster Inc. pp. 1148.

U.S. Army. 2002. **ARTEP 3-627-35-MTP, Mission Training Plan For Weapons of Mass Destruction (WMD) - Civil Support Team (CST).** Fort Monroe. Virginia: U.S. Army, Training and Doctrine Command. 22 June.

Recovering From Trauma in the Workplace

Michael H. Smith, Ph.D.
&
Robert Zelman, Ph.D.

These days when we think about trauma in the workplace we inevitably think of the horrors of September 11. But there are a number of more commonplace incidents that are included in the notion of workplace trauma, such as: the death or serious illness of a coworker, accidents, violence, layoffs or closures and natural disasters (e.g., the 1991 Oakland, CA fire and the big Northridge, CA earthquake in 1994). And the just concluded war with Iraq is also having an impact at the workplace.

A workplace trauma (also called a critical incident) is a work-related crisis that is overwhelming to the individuals involved, produces unusually strong emotional reactions and/or seems beyond their ability to cope with it. It is a wrenching event that takes some time to recover from.

There are many symptoms that people experience after a traumatic event. We've grouped them into four main categories:

EMOTIONAL

- Numbness as an initial protective device until one can deal with the trauma.
- Hopelessness and helplessness about the capability of making things better
- Grief and depression around pain and loss
- Fear, anxiety and worry about possible negative future events.
- Anger at yourself or someone else which is often a reaction to helplessness.
- Survivor guilt (feeling guilty that you survived the trauma while others did not)

MENTAL

- Blaming God, self or others. Seeking some explanation and accountability.
- Difficulty in making decisions. Confused by too much, or too little, information about the event.
- Recurring thoughts, memories or flashbacks as a method to "make sense" of the event
- Overly critical thoughts such as "why wasn't this prevented?"
- Lack of concentration as the event may overwhelm the capacity to think clearly
- "Why me?" thoughts as a reaction to hopelessness
- "What now?" thoughts as a reaction to helplessness

BEHAVIORAL

- Lowered productivity, morale and creativity as a reaction to the emotional and mental impact of the trauma (see above)

- Social withdrawal or overly social behavior as an individual attempts to cope.
- Compulsions: drugs, alcohol, workaholism, shopping, eating, etc. as mechanisms to kill pain.

PHYSICAL

- Stress-related ailments such as stomachaches, headaches, etc.
- Fatigue as a result of feeling overwhelmed, guilty or hopeless.
- Sleep problems as the body copes with the trauma.
- Lowered libido

Usually, most organizations deal with workplace trauma *after* the fact, i.e., once it has happened, they hold a debriefing, offer support to the individuals involved, etc. While this is essential, we believe that it's also particularly useful to help your employees understand what might happen to them during a traumatic incident *before* it happens. Doing so will make it less likely that they will think they are overreacting from the intense emotions, which is a common response. Also, since so many Americans have been traumatized by the experience of 9/11, doing a short workshop on workplace trauma would help them cope with those memories as well.

When we do this kind of workshop, we define the term "trauma" and list the various symptoms as we've done here. Then we explain Elizabeth Kubler-Ross' model of how people cope with death or tragedy in their lives. This is her classic model as we apply it to traumatic incidents:

- **Denial** – During the first stage of this process, people are in shock or denial; they don't fully believe that the trauma really happened.
- **Anger and Guilt** – Once people admit to themselves that the trauma actually happened, they are inevitably angry. They often blame themselves, other people or God for what happened.
- **Bargaining** – Kubler-Ross talks about bargaining with God here, e.g., "I'll be a better person if you let me live." Essentially, bargaining is a way of coming to terms with the past and embracing the future.
- **Depression** – Underneath all the anger and blame, people feel a deep sense of loss and grief. It is very important to feel these deep emotions.
- **Acceptance** – Being willing to feel the grief allows people to come to peace with the trauma. Having experienced all of these other emotions, we can finally accept the traumatic experience.

People often ask us if they have to go through all the stages. We tell them that they will, in fact, go through all the stages. Some will do it very quickly; some will take longer. How fast each stage takes is up to the individual and is impacted by their experience, coping skills and maturity level.

We encourage people to take care of themselves by eating well, exercising and getting plenty of rest. We also urge them to share their feelings with co-workers, friends and family.

> Once we've dealt with the personal issues in the workshop, we focus on the organizational aspects of workplace trauma. In line with our idea of preparing for traumas *before* they happen, we have begun to recommend that organizations create a Trauma Advisory Committee to set company-wide policy in this area. The fundamental job of this committee is to create policies that deal with how the organization will help the affected individuals in a trauma, whether it is one person who is dying from an illness or everyone in the company who's been affected by a fire or severe layoffs. Then when a crisis occurs, the organization will automatically know how to react promptly and appropriately. Doing so will clear up feelings of inequity that occur when, for example, one manager allows a traumatized employee to take some time off and another manager does not.

This committee should be drawn from a cross-section of people in the company from front-line employees to top management. It is very important that everyone feel that they have a voice in these issues.

Since 9/11, we have been thinking a lot about compassion as an essential workplace value for the new millennium. We were inspired by an article called "Leading in Times of Trauma" by Jane E. Dutton, et. al., in the January 2002 issue of the Harvard Business Review. It set out the importance of organizations responding with compassion after a trauma and gave a number of examples (both good and bad) from September 11. The authors made the point that compassionate action lifts people's morale, enhances their productivity and strengthens their loyalty to the organization.

Essentially, compassion involves a feeling of empathy for people who are suffering and taking an appropriate action to relieve that suffering in some way. A classic example would be the 60% of Americans who donated money, time or blood to charity after 9/11. Action is the key word here; empathy alone is not enough.

So your organization needs to decide that it will respond with compassion to future workplace traumas. Then it needs to spell out the particular actions that will be taken after various kinds of traumas.

For example, it is common to bring in a trained professional to do a debriefing after a trauma. A debriefing is a small group discussion of the incident. In fact, it is absolutely essential after a major trauma. But it is also necessary after seemingly lesser incidents like the death of a coworker. The purpose of the debriefing is to reassure people that they are not overreacting because of the intense feelings they are experiencing. It also gives them a safe space to express their grief and other feelings.

Common actions organizations may take after the death of an employee include:

- Encouraging employees to go to the funeral
- Creating a physical space for flowers, cards and mementos
- Having a memorial where people can share their memories of the deceased
- Starting an education trust fund for the deceased's children
- Giving out appropriate therapeutic resources from the Employee Assistance Program or Human Resources Department.
  More creative responses might include:
- Hiring a personal chef for the deceased's family.
- Giving the family a gift certificate for an errand service to help them cope with essential tasks
- Encouraging employees to help the family take care of the children.

In terms of major traumas like workplace violence, an earthquake or layoff actions often include:

- An encouraging statement by top management about the future
- An ongoing support group for people to express their feelings
- A re-examination of current priorities

Other more innovative approaches might include:

- Creating a toll-free phone number for employee suggestions on how to get through the trauma
- Giving gift certificates for massages, short-term gym memberships or other forms of stress release
- Giving employees a reduced salary to do volunteer work instead of laying them off (Cisco Systems uses this approach very successfully.)

The key here is discovering the most compassionate things you can do to help your people get through the trauma. As former New York City Mayor Rudy Giuliani said about post-September 11 New York: "You look in your heart and you do the right thing."

As we've said in this article, organizations rarely prepare beforehand for workplace traumas. But there are many benefits to doing so. For example, if you have a trained professional available who can do a debriefing within a day or two after a traumatic event occurs, people can move on more quickly. By being able to express their feelings openly in a safe space, they are less likely to develop post-traumatic stress disorder in the months to come after the trauma.

A trained debriefer can recognize those people who are really having trouble. Those people can be sent to the Employee Assistance Program or other resources for further help.

When people get over the trauma quickly, they will be productive again much sooner. They will also have a deeper connection with each other because they've shared their feelings in an open manner. This will have a positive effect on their teamwork. If employees don't attend a debriefing, they will talk about the trauma informally. But it will take longer for them to get over it this way. And if they don't get resolution, they are more likely to take sick days to recover. They may begin getting headaches, stomach aches or more serious stress-related illnesses such as respiratory and cardiovascular diseases. They may also turn to drugs or alcohol to cope with their stress. If you create a Trauma Advisory Committee and decide upon a plan for dealing with traumas when they happen, you will cut down on all the normal confusion that arises when people try to figure out what they should do after a trauma occurs. You will get people to buy into the various things to do beforehand so there won't be dissension during a very stressful period.

By deciding on the most compassionate responses beforehand, you will show your people that you care about their well-being, This will make them feel good about working for the organization. Workplace traumas are always difficult for everyone involved. But if you prepare before and deal with it as soon as possible according to your plan, it can be much easier on your people and your organization will emerge much stronger. These are traumatic times. By putting this model in place now, you will not only be prepared for the next trauma but all of those that will come in the future as well.

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Visualization of Flood Mitigation Models using 3D Web-Based GIS

Rifaat Abdalla, Steve Liang, John Sorrell and Vincent Tao

1. Introduction

The application of Geographic Information Systems (GIS) has provided the opportunity to better visualize and manage water resources through comprehensive environmental model simulation and conceptualization. In general, the term modeling refers to the research process that leads to a construction of a "model". The term model refers to the set of processes designed for reality approximation. Recent advancement in computer technology makes visual modeling become feasible. Watershed models are an integral part of environmental modeling that has an obvious and explicit spatial dimension. Geospatial Information Systems (GIS) are now widely used as powerful environmental simulation modeling tools. Environmental simulation models can be defined as a computer-based technique to imitate or simulate the operations of various kinds of real world processes (Goodchild, 1993). Hydraulic fluid flow modeling is one of these the important GIS modeling and visualization applications.

Geographic information can be defined as a system of software, hardware and user that is designed to allow for modeling, visualization, data management, data analysis and manipulatation, for wide range of applications. The basic functionality of the GIS is summarized by its capability of integrating data from different sources; its ability to process and conceptualize spatial information; its ability to allow spatial database management; and its ability to produce digital multi dimensional computerized maps. GIS conceptualize information through the process of digital data abstraction and representation.

The ability to express certain environmental and physical processes is not always simple, because the real-world environmental processes are typically three dimensional, time dependent and complex, which make it difficult to obtain a complete qualitative and quantitative understanding for these processes. However, recent developments in GIS allowed for representing 3D features on the desktop systems as well as over the Internet. In comparison to the advancements in 3D visualization, relatively little has been accomplished in the realization of a practical 3D GIS. The obvious reason remains: the transition to 3D means an even greater diversity of object types and spatial relationships as well as very large data volumes. In a 2D GIS, a feature or phenomenon is represented as an area of grid cells or as an area within a polygon boundary. A 3D GIS, on the other hand, deals with volumes. Consider a cube. Instead of looking at just its faces, there must also be information about what lies inside the cube. To work, 3D GIS require this information to be complete and continuous. Clearly, the data management task has increased by another power. One possible concern in the past was the initial task of acquiring 3D data. However, as the recent advances of spatial data collection

technologies, such as Lidar, SAR, and high-resolution satellite images (IKONOS and Quickbird), acquiring 3D spatial information become much easier, faster and cheaper than before. Therefore, true power of a 3D GIS, then, is the ability to communicate complex geographic phenomena. Besides showing change, the added dimensionality of a 3D GIS allows geographers to move themselves from primitive representation of fence diagrams, isometric surfaces, multiple surfaces, stereo block diagrams, and geo-object cut-always. Still, perpetual improvements in hardware and software technology will ensure that a 3D GIS becomes easier to implement and finds some unique uses elsewhere in the discipline. The importance of 3D web-based GIS modeling and visualization comes from the purpose of maps, geographers know, is to model reality. In the Nature of Maps Robinson & Petchenik (1976) defined a map as a "graphic representation of the milieu." The use of the term milieu is interesting because it suggests much more than the flat, static maps we are familiar with. It presents a challenge to step beyond the comfortable reach of two dimensional (2D) representations to higher dimensions of visualization. To model reality most clearly, it certainly makes sense that we strive to map what we actually experience. What follows is a brief look at the addition of a third dimension (3D) to geographic visualization and geographic information systems (GIS).

An increasingly important and popular application of 3D Web-Based GIS is for deriving conceptual models for Disaster Management and Emergency Response, so as to identify the exact needs and requirements for mitigation and make these applications available for multiple users over the internet. Based on that, the primary objectives of this research are:

1. To select a section of a watershed that is of special importance to the environment
2. To simulate the hydrologic flow and design flood prediction scenario
3. To show the spatial extent of the modeled section in a GIS Environment using ArcView or ArcGIS
4. To bring the visual simulated product to a web-based environment using 3D feature (DEM).

2. Current Status

Due to the rapid development in GIS technologies, new methods to delineate watershed and extract topographic, topologic, and hydrologic information from satellite imageries, digital terrain data and tabular data have been developed for use with desktop GIS technology. Maitra (2001) used GIS and Remote Sensing for conducting watershed analysis of the Man River in India as a stage of Environmental Impact Assessment project for a dam construction. The Man River that was analyzed shares some characteristics with the Don Valley. Maitra generated thematic maps of various natural resources from remote sensing sources i.e. satellite imageries data.

Geographical information always has a location-based element to it: "the where of information". And the information is usually presented as a map. Not just a picture of a map. GIS professionals worldwide are becoming increasingly aware of Web-based solutions for GIS. These professionals are mostly concerned with today's facts and not future predictions. So why consider the future of Internet GIS? The answer is that

Internet's distributed computing environment is revolutionizing the way we do business by delivering compelling technologies, which answer real needs. Clearly, the GIS industry has recognized this revolution and is actively involved in its design, despite the added complexity introduced by managing spatial database; databases that are both delicate and, by any definition, massive. This effort is characterized in part by the Open GIS Consortium's Web Mapping Test Bed. The reward for these efforts is expected to be a well-designed architecture that delivers efficient and powerful usage of computing infrastructures. The emerging architecture will support applications, which reduce operating expenses faster, increase productivity and dramatically improve customer satisfaction and retention.

While no computing environment has been entirely eliminated (mainframe and workstation computing is still active), the industry has seen the introduction and rapid adoption of desktop and now distributed models. Distributed computing is a generic term that includes other terms like Internet, Intranet, Extranet, the Web, net-work-centric, and more. Regardless of the terminology, the growing trend is to distribute computing services across a physical infrastructure of networked data storage devices and computer processors. The newer environment includes both two and three tier model where the physical locations of the data storage and application processing are not on the same machine (or in the same country) as each other or the client interface. It is this migration from a workstation or desktop's one-tier solution to a component and transaction-based model that is reshaping the future of GIS.

3. Significance of web-based GIS?

GIS stands for Geographic or Geospatial Information Systems, with an emphasis on information. Geographical information always has a location-based element to it: "the where of information". And the information is usually presented as a map.

Web-based GIS is a central managed and distributed computing architecture. While no computing environment has been entirely eliminated (mainframe and workstation computing is still active), the industry has seen the introduction and rapid adoption of desktop and now distributed models. Distributed computing is a generic term that includes other terms like Internet, Intranet, Extranet, the Web, net-work-centric, and more. Regardless of the terminology, the growing trend is to distribute computing services across a physical infrastructure of networked data storage devices and computer processors. The newer environment includes both two and three tier model where the physical locations of the data storage and application processing are not on the same machine (or in the same country) as each other or the client interface. It is this migration from a workstation or desktop's one-tier solution to a component and transaction-based model that is reshaping the future of GIS (Tao, 2001).

4. Case Study of the Don Valley:

The study area relates to a section of The Don River. The Don River is a unique river system, as it flows through the core of the Greater Toronto Area (GTA). The origin of the

Don River is located at the Oak Ridges Moraine where the headwaters are fed by numerous aquifers. The river then flows south for 38 kilometers to Lake Ontario and provides drainage for 360 square kilometers of land. The section used for this study is part of the huge watershed system in the province of Ontario. This section is located within the extent North York municipal boundaries. Figure 1 is showing the study area.

York University Map library provided topographic digital data in the form of shapefiles and 10 meters filled DEM. DEMs are grids representing elevation of the terrain, and are available at several scales and levels of detail. Topographic sheets of the area were used as reference for conducting this study Flow Statistics data was hypothetically simulated.

The software used for performing this study is: HEC-RAS and HEC-GeoRAS from US corps of Engineers, and ArcGIS/ ArcView from Environmental Systems Research Institute (ESRI). HEC-RAS (Hydrologic Engineering Center - River Analysis System) is a one dimensional, steady state modeling program for river hydraulics intended for calculating water surface profiles at cross-sections along a stream, for both steady and unsteady flow.

GeoServNet is a distributed web-based 3D GIS developed by GeoICT Lab at York University. GeoServNet uses progressive streaming technology and intelligent data transmission strategy, in order to squeeze each drop of the bandwidth for good use.

GeoServNet is platform independent. It is designed and implemented using java and java 3D technology, and can be deployed easily in any machine. GeoServNet is interoperable. It confirms OGC standards and has been proved compatible with OGC Web Services. In this project, we use this powerful web-based 3D GIS platform to present a whole new angle to see the flood scenario in both 2D and 3D way on Internet.
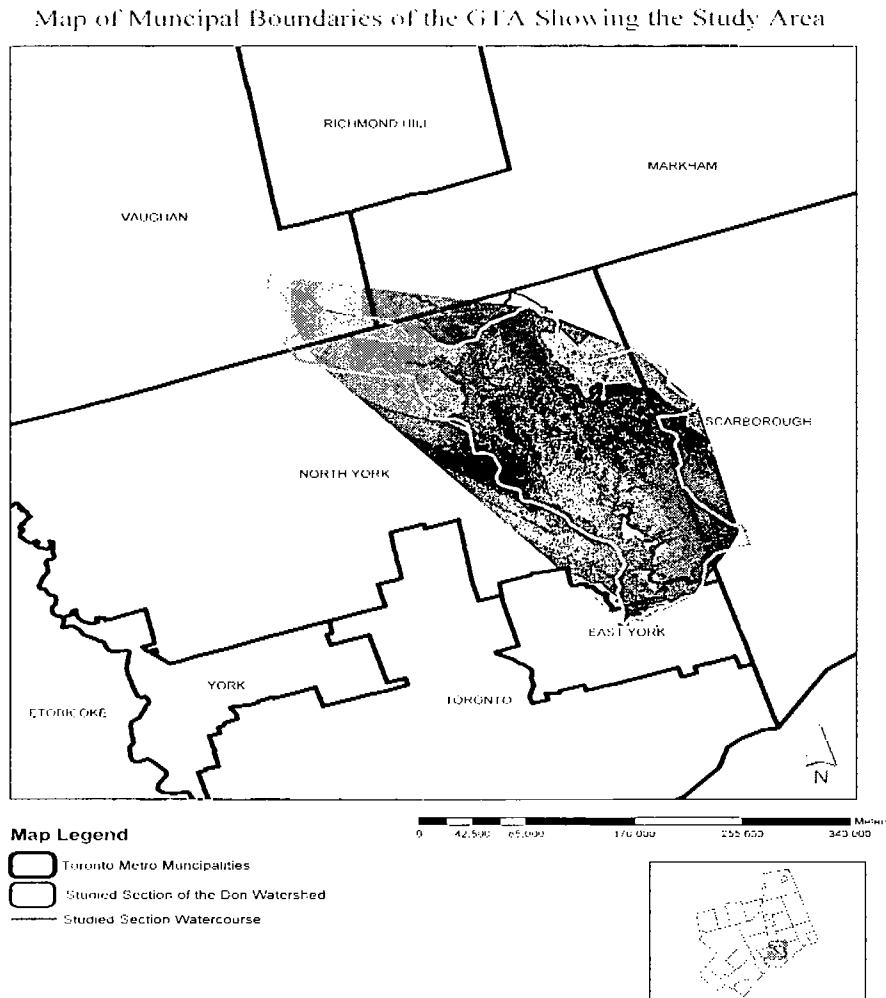
5. Methodology:

The GIS analysis applied in this research attempts to conceptually simulate the recent shape of the stream, and predict flooding scenario. The GIS analysis conducted beginning from the GIS DEM generation, followed by floodplain boundaries reaching to the Don River channel geometry in a process known as pre-processing; this step was followed by step involved floodplain delineation and known as post-processing. In post-processing the final river channel was extracted and the actual floodplain extent was delineated an visualized from hydraulic simulation parameters that were obtained from HEC-RAS software, following that, the resulted GIS model was brought to the GeoServNet.

The GIS analysis techniques used for conducting this research involved deriving channel (cross-section) geometry from DEM and visualizing flood model obtained from applying GIS generated geometry data with flow data for simulating different flooding scenarios.

A new DEM was constructed in the form of Triangular Irregular Network (TIN) and the complete dataset was visualized. TINs are representation of X, Y coordinates with Z of the elevation. The analysis that was performed to conceptually simulate The Don River

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involved two major processing stages, pre-processing and post-processing. In pre-processing stage, the major shapefiles and 3D files that are used in designing the

Map of Muncipal Boundaries of the GTA Showing the Study Area

Map Legend

⬭ Toronto Metro Muncipalities

⬭ Studied Section of the Don Watershed

—— Studied Section Watercourse

Figure (1) study area

geometry were created and finally an export file copied all these geometry features to be processed in HEC-RAS. The second stage, which is post-processing resorted the simulated HEC-RAS steady flow model and processed this model with the help of the TIN file to delineate the flood plain.

Pre-processing is the first stage in the GIS generation. It involves number of tools that are used for creation of shapefiles that will be used in developing the geometry of the section studied from The Don River. The steps below will summarize procedures used for creation HEC-RAS export file. These five themes are: the stream centerline, banks, flow path, centerline, cross-sectional cut line themes and land use themes. The digitized Shapefiles are shown in Figure 2. The stream centerline theme is used to establish the river reach network, which was represented by one reach in this project. The streamline

theme was ready for the single reach. It was necessary to create upstream endpoints before creating the reach in the downstream. River reach was labeled as an identifier and a reach name was assigned. Then it was possible for writing RAS GIS import file. RAS GIS import file was created, and a complete file with a header, stream network, and cross section information was generated.
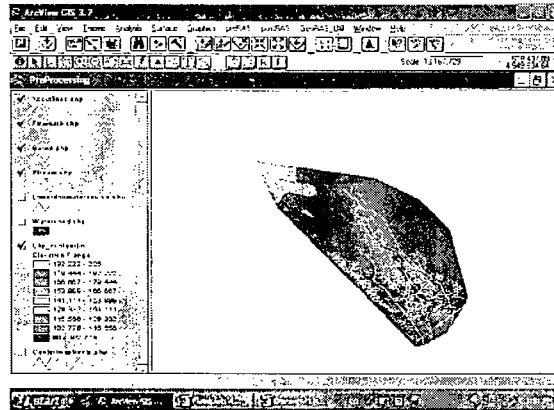
Figure (2) digitized channel geometry parameters over the clipped TIN

Five direct major steps were performed in concert for conducting hydraulic simulation. The first step was to create a new project for river simulation; the second step involved utilizing the GIS data. The GIS imported information is in the form of detailed geometry data that displays geometry derived. The third step was modeling the flow data; this was achieved in two different stages, the first was by entering flow profiles for the cross sections generated for the section of study area, hypothetical flow rates were used in this research in order to support the concept of the approach, the second was entering water surface profiles.

Post processing is the third phase in conceptualizing The Don River model. HEC-RAS Data can be read into GIS mainly through ArcView and HEC-GeoRAS, with steady flow model export file created, post-processing aspects are used to map the flood plain over the TIN. Once the GIS export file has been processed, it would not be a difficult task to create water surface data sets. All post-processing stages from this point forward will be using The Don TIN. Post-processing is performed in three separate steps. These steps start with the generation of the bounding polygon and cross section alignments. These are read directly from the GIS export file and new themes are created for each. Water surface TIN was created next with the extent defined by the bounding polygon. The water surface elevations at each cross section were applied along the cross section alignments and treating the cross sections as break-lines in the elevations creates the TIN. The final step was meshing the water surface TIN with the terrain TIN to produce the floodplain. This step converts the water surface TIN and the terrain TIN into grids according to the rasterization cell size specified in the first step as shown in Figure "3".
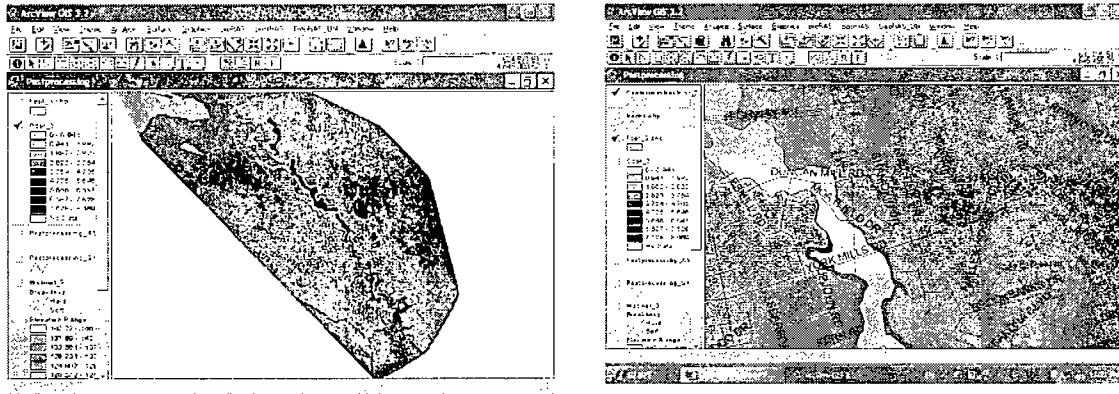
Figure (3) resulted hydraulics simulation showing the derived channel cross section and water surface profile in the post processing stage

The rise of the Internet provides GIS communities with a new technology for disseminating spatial information to the general public. Web-based GIS is a new phenomenon in the recent years and become more and more popular (Yuan, 2000). Web-based GIS delivers spatial information for wide distribution across user communities and organizations. It also makes spatial information accessible over the ubiquitous Internet and gives viewers a consistent view of GIS datasets. However, because of the limited bandwidth of the Internet, the design of publishing GIS datasets to a web-based GIS will largely affect the performance of the system. Some key factors, such as data formats, data volume and the balance of data loading sequences, need to be considered when publishing GIS data to a web-based GIS. In order to have smooth and fast visualization effect on a web-based GIS, some strategies for data preparation are needed. These strategies allow progressive and interactive visualization of GIS datasets through Internet. For the purpose of Internet visualization, GIS data are mainly divided into three parts: vector data, raster data and DEM data. Although for each datasets, it has its own unique data transmission protocol, all three types are mainly following the same principle of Level-Of-Detail (LOD) (Hugues Hoppe, 1996). LOD is a mechanism used in computer graphics to improve the drawing speed of complex scenes. Based on this principle, each object is stored several times in different levels of quality (levels of detail). During visualization each object is drawn in the optimal level of detail. The chosen level depends on the size of the object in the current view. Objects that appear small can be drawn in little detail (and therefore very fast) without loosing quality; in contrast, objects near the point of view that cover a lot of space on the screen need to be rendered in full quality.

6. Results and Discussion:

This project aims to contribute to the application of the internet-based GIS integration as an application to Environmental Visual Modeling. The contribution described in this research may be considered as an additional input to the theme of Hydraulics Engineering applications. It was realized that web-based GIS have become increasingly important in hydraulics simulations. However, the current use of RS information in the field of

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planning, design and operation of water resources systems still falls far below its potential (*Schultz*, *1997*) therefore, this model tried to incorporate cutting-edge technologies and include Environmental Simulation, Desktop GIS, and Web-based GIS. By applying the procedures detailed in methodology section it was possible to develop conceptual flood model. The results obtained from applying this methodology are shown in Figure 4, 5 and 6.
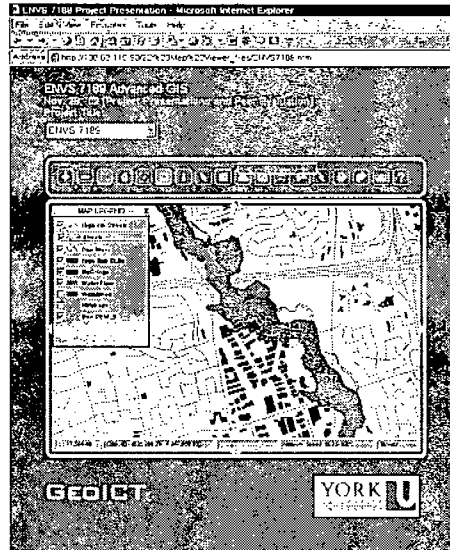
Figure (4) the flood extent of the study area. The purple polygons represent the building footprints. The red polygons are the buildings, which affected by the flood. This map is displayed by a java applet, which is loaded remotely, and the server streams the data to the applet client.

Results of the GIS Analysis and Hydraulic Simulation of spatial features, has been implemented as an automated tool that can be used with very sophisticated, powerful software such as ArcInfo and ArcView. This is in order to define and connect the hydrological units, then linking them to hydrological simulation packages such as HEC-RAS or HEC-HMS for producing conceptual hydrological model. The strong integration showed by ArcView and HEC-RAS in developing series of shapefiles based on a DEM background to produce stream channel geometry, is considered very unique. This is in terms of functionality and interchange of the software process. This model is considered unique among other models developed recently because it utilized three different technologies to come up with a new integration way that comprises ArcView/ArcGIS, (desktop GIS) HEC-RAS, (Hydraulic Simulation) and GeoServNet (Web-based GIS).

Figure (5) 3D view of figure [5] you can easily tell the difference between 2D and 3D. The advantage of 3D lies in the way we see the information and it is the world we live.

Results obtained from Pre-processing stage of the software, which were in the form of different shapefiles that are digitized to represent the stream center line, stream banks, flow path, indicated that this parameters are very important in generating channel geometry details. The attribution of these shapefiles according to "from-to" vector topology parameters were very important in keeping the flow direction and the DEM elevation details prior to the step of extracting the details of the model. The information gathered from the DEM integration with the digitized cross section allowed representing the channel geometry. This was achieved in ten different cross sections and provided 3D parameters. HEC-RAS to represent the stream channel in 3D.

Van Driel (1989) recognized that the advantage of 3D lies in the way we see the information. It is estimated that 50 percent of the brain's neurons are involved in vision. What's more, it is believed that 3D displays stimulate more neurons: involving a larger portion of the brain in the problem solving process. With 2D contour maps, for example, the mind must first build a conceptual model of the relief before any analysis can be made. Considering the cartographic complexity of some terrain, this can be an arduous task for even the most dexterous mind. 3D display, however, simulates spatial reality, thus allowing the viewer to more quickly recognize and understand changes in elevation. (Doyle, S *et al* 1998)

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Figure (6) shows the fly through function provided by GeoServNet.

Geographic Visualization depends on psychological cues to create a natural 3D scene on a 2D computer monitor. In a sense, visualization models are not photographs, but pictures or renditions. Hence, the process of generating a scene is termed rendering. To render the most realistic scene, the geographer might rely on such visual cues as simple perspective rules or the subtle change of color or texture with distance. Depth may also come from feature obstruction and overlap, or from the addition of atmospheric attenuation such as fog or haze. Often the clever use of lighting sources and clouds can heighten the relative distance within a scene. Finally, the generation of trees or even seasonal characteristics such as snow can artificially enhance the sense of reality. There are physiological cues, as well, such as accommodation, convergence, or the retinal disparity of a stereoscopic image. Whatever the combination, geographers should be careful not to abstract reality too much, consequently misleading the audience.

7. Conclusions

Reaching to quantitative understanding and prediction of flooding scenarios based on GIS is of special importance especially in the fields of environmental protection and planning, agriculture, emergency response and preparedness. Traditional techniques for flood estimation and simulation are always 2-D and lack spatial extent.

This approach was dedicated to describing a new approach of using GIS for the sake of environmental hydraulics simulations. This integrated approach utilized GIS as tools for spatial analysis and visualization along with HEC-RAS as Hydrological modeling software, is of special importance because it links the modern Geomatics Engineering and Hydraulic Engineering methodologies in a single project.

The deliverables of this research were in form of 3D Internet based flood model that show flood extent of the Don River, a TIN model of the study area, and HEC-RAS

simulation model visualized in 3D cross section for The Don River Section. The conclusions of this research could be summarized in the following points

1. It was attainable to model and simulate for the Don Valley Flood Inundation using GIS and Hydraulics Engineering Software.

2. ArcView 3D analyst, HEC-RAS and HEC-GeoRAS are efficient and user-friendly software for flood Inundation.

3. Model Accuracy is mainly based on the DEM accuracy

4. 3D Internet-based GIS are very competent and useful in showing spatial extent of flood modeling and make it accessible for multiple users, which aid decision makes and planners.

References:

Doyle, S., Dodge, M., and Smith, A., 1998, The potential of web-based mapping and virtual reality technologies for modeling urban environments. Computers, Environment and Urban Systems, 22, 137–155.

Goodchild, M. F., Parks, O. P., and Steyaert, L.T., 1993, Environmental Modeling with GIS, 1/e, Oxford University Press, 488

Hugues Hoppe, 1996, Progressive Meshes, SIGGRAPH '96 Proc,, pp. 99-108.

Maitra, S., 2001, Environmental Impact Assessment for DAM Construction using GIS/Remote Sensing, Proceedings of the 21st ESRI Users Conference, San Diego, California

Olivera, F. and D.R. Maidment, 1999, GIS Tools for HMS Modeling Support, Proceedings of the 19th ESRI Users Conference, San Diego, CA.

Robinson, A.H. & B.B. Petchenik., 1976, The Nature of Maps. Chicago: University of Chicago Press.

Schlutz, G. A. 1997, Use of remote sensing data in in a GIS environment for water resources management. In: Remote Sensing and Geographic Information Systems for design and operations of Water Resources Systems, edited By M.F. Baugameter, G. A. Schutz and A. I. Johnson, Proceedings of Rabat Symposium, May 1997.

Styaert, L. T., 1993, A Perspective on the State of Environmental Simulation Modeling, Environmental Modeling with GIS, Oxford press, 17

Tao, C.V. (2001), Online GIServices, Journal of Geospatial Engineering, Vol. 3, No. 2, pp. 135-143, December, 2001.

Van Driel, Nicholas J., 1989, Three dimensional display of geologic data.

Yang, X., Damen, M. C. J., Zuidam, R. A., 1999, Satellite Remote Sensing and GIS for the analysis of channel migration changes in the active Yellow River Delta, China, International Journal of Applied Earth Observation and Geo-information. Vol. 12, 146-157

Yuan, S., 2000, Development of a Distributed Reprocessing Service Model, M.Sc. thesis of Department of Geomatics Engineering, University of Calgary, Alberta, Canada. pp. 23

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THE POLITICS OF DISASTER
Principles for Local Emergency Managers and Elected Officials

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INTRODUCTION:

This is how most members of the Emergency Management and Emergency Services disciplines typically view politicians during disasters. And, while it may be a popular attitude, it is certainly not a very practical one if we expect to achieve everything we can for our communities when disasters strike. Why should this be so?

First, we need special powers and authorities to deal with disaster situations and elected officials have the ability to provide them. As much as professional emergency managers, emergency services chiefs and other staff would like to believe we operate with autonomy, we all realize we are really just the "hired help" when it comes to many aspects of disaster response and recovery. Virtually every state has disaster legislation which allows for special powers and authorities to be exercised by duly elected officials. The general rule of thumb here is that if we have to take actions during a disaster which will infringe on the ordinary rights and privileges of the citizens, only a duly elected representative of those citizens may authorize such extraordinary measures.

Secondly, we need all the help we can get. Elected officials can expedite assistance. As I'll discuss later, most outside resources which come to a community are accessed through a governmental (political) process. The process of requesting, justifying and acquiring such assistance is one of the most "political" of all disaster actions. Generally, elected officials are the most effective persons we have in expediting this assistance.

Finally, we need public support. Elected officials represent the people and in a democratic republic, the people's representatives hold the ultimate authority. They also are the most appropriate spokespersons when it comes to providing guidance to the public and obtaining public support for disaster related actions. The bottom line is that we work for them. The people hold them accountable and they hold us accountable.

PRINCIPLES:

All Disasters are Political: Whether we want to believe it or not, political considerations are a significant factor in the preparation for, response to, recovery from and mitigation of disaster events. Think back to disasters you have personally been involved in or you've seen in other parts of the country. Has there ever been one where there was no political involvement? Is it likely that there ever will be one? I'm quite sure the answer to both questions is "no". If we really analyze the events and issues

<u>surrounding disasters, we readily see that politics is an integral element of the disaster and that element has to be dealt with just like any other disaster impact.</u>

If we are to adequately discuss this principle, it is necessary to look into why disasters are naturally so fraught with political considerations and to consider the factors which determine how political a disaster might become.

There are at least three basic reasons why disasters are political in nature. First and most important, disasters affect people. Basic Emergency Management doctrine tells us that the determination of what constitutes a disaster is the impact it has on people. The impact of a disaster is measured with regard to how people are affected. In situations where there is no impact, there is no disaster regardless of the actual occurrence of a hazardous event (e.g. an extremely violent and large tornado occurs in a totally uninhabited area of the country.)

When we do hazard analyses, we look at two elements, probability and vulnerability. Vulnerability is almost always expressed in terms of the potential impact on people. A disaster then, by definition, involves people, and any event which significantly affects the lives and property of people is political.

Secondly, disasters are political because they involve public policy. How well or how poorly we mitigate, prepare for, respond to and recover from disasters is directly related to how well emergency management/disaster policy is created, maintained and implemented. By definition, politics is the process of establishing and carrying out public policy. Failures in policy or its implementation is the stuff around which political debates revolve and of which political campaigns are made. A disaster event brings this policy debate squarely into the political arena.

Third, and related to the first two reasons, is the fact that disasters invariably invite public (read media) interest. In our modern culture of all-pervasive mass communications, disasters are dramatic, newsworthy events which compel intense public interest. Politicians appropriately have to respond to that kind of interest and scrutiny.

There are a number of very important factors which can determine how "political" a particular disaster situation can become. First there is the nature of the disaster itself. Generally speaking a violent event tends to be more political than slow growing events which do not initially attract as much attention. In the era of terrorism, such events as Oklahoma City and 9/11 are incredibly political. The very definition of terrorism assumes an intent to affect political attitudes. If the cause of an event is such as to involve potential blame, the politicization of the event is significantly increased. We don't tend to blame nature (or God) for natural events. We do, however, increase the media (and therefore the political) "feeding frenzy" when there is potentially a human cause for the disaster. Events such as Three-Mile Island or the Bohpal chemical release are only the most obvious examples. The scope of the disaster affects the political nature of it. Obviously, an event which involves local, state and federal actions has more potential for political implications.

A second factor is the degree to which public policies become a part of the disaster event. This can be affected by such things as the level of response involved and the requirement to deal with difficult or uncharacteristic issues which adversely affect or irritate the public (e.g. evacuations, seizure of private property, curfews and quarantines.) Events or potential events which could have been prevented or lessened by mitigation actions (e.g. flooding, earthquakes, etc.) will necessarily bring policy questions into the disaster event.

A third factor involves the quality of decisions and response actions. Such considerations as: Were response efforts handled adequately or in a timely fashion? Were mistakes made or was the response slow and poorly coordinated? What is the level of perceived public dissatisfaction? Such elements combined with public (or media) questions and controversy will increase the political aspect of the event significantly.

Fourth, the nature of the political environment in the community will have an impact on the disaster situation. Such things as whether the political players are on the same "team", whether previous partisan divisions existed or whether disaster policy disagreements have been a factor in the past all affect, to one degree or another the disaster's political climate. Are the political players adversaries generally, disinclined to cooperate or do they share a common political agenda? Two different scenarios come to mind. During the Loma Prieta earthquake, the national administration was Republican and the city of San Francisco was Democrat. There was significant conflict regarding response and recovery issues attributable to this political reality. Conversely, when the *Republican* Mayor of New York City, the *Republican* Governor of New York and the *Republican* President were from the same party, that fact also had an (in this case a positive) impact on the aftermath of the World Trade Center attack. Of course (and this is meant sincerely, not cynically) the fact that a disaster occurs during an election year is not an insignificant consideration.

Disaster Policy is Difficult to Create and Maintain: One very frustrating factor confronting emergency managers at all levels of government is that it is often difficult to get policy support from senior elected officials before a disaster event occurs. The problem is that disaster policy issues are often monumental and very complicated, involving conflicting interests at every level of government. Generally there is a real reluctance on the part of elected officials to create controversy and debate until the need is immediate and unavoidable. Obviously this reluctance is at odds with the emergency manager's requirement to establish the "ground rules" regarding disaster activities in advance of an actual disaster occurrence. At the local level, this problem is compounded by the fact that local jurisdictions are the most immediately affected, but tend to be the least interested in disaster issues. Beverly Cigler has observed, for example, that "…the governments least likely to perceive emergency management as a key priority – local governments – are at center stage in terms of responsibility for emergency management."

Even when the need to establish policy in advance of disasters is accepted and understood, the process of establishing and maintaining such policy is a challenging undertaking. It is virtually impossible to design policies and programs that meet all needs

and satisfy all of the competing interests. These conflicting interests can be about broad national policy, for example, should we mitigate the impacts of flooding by the use of flood management structures (dikes, levees, stream clearance/widening, etc.) or by buyouts of flood prone properties and/or relocation of communities in the floodplain? They are often about specific local issues which often are of great political and economic import to the communities involved. (I once knew of a small county emergency manager who almost lost her job because she proposed to open the local armory to blizzard-stranded travelers before the local motels were full!) Of course, during the current fiscal difficulties, this complex process must constantly attempt to balance the need to provide disaster services while being fiscally responsible with tax dollars. Add to this complexity the fact that needs are constantly changing and that public expectations in response to a disaster are invariably (and often unreasonably) high, perhaps it is amazing that we can get politicians to tackle disaster policy making at all.

Disasters have Political Consequences: One widely observed but not fully understood principle of the disaster/politics relationship is the fact that disasters and their aftermath have significant potential to affect the political environment of a community, state or nation. A disaster can alter the public's perceptions about the ability and concern of the political players. It also causes them to be more sensitive to criticism of response/relief efforts. Each of us can relate instances where political futures and political landscapes were changed by a disaster event and the resulting leadership (or lack thereof). Perhaps the current political result of the attacks on the World Trade Center is the most striking in recent history. An American President is elected by the barest of electoral majorities and actually looses the popular vote, is perceived to be weak with questionable leadership skills. September 11, 2001 occurs, and that same President's handling of the resulting impact of the attack is perceived as masterful and, as of this writing, he enjoys one of the most popular presidencies of modern times. A "lame duck" mayor of New York, beset by personal problems, becomes the very symbol of political leadership and is immensely popular both in New York and nationally. Approximately a decade earlier, the father of the current President was perceived to have been slow and insensitive in response to the catastrophic impact of Hurricane Andrew in South Florida. This perception coupled with a sluggish economy changed the political fortunes of that administration in exactly the opposite direction. Similar examples at all levels of government also exist. Sometimes the political impact of a disaster can have mixed results over time. In one midwestern community which experienced massive flooding, the mayor was initially hailed as providing excellent leadership. As the problems of the recovery began to mount, however, she became so unpopular that she failed re-election just two years later.

While these examples are of Presidents and mayors, all elected political leaders are subject to the political impact of disasters. Who are the major political players in a disaster and how can they be affected? The political impacts differ most notably between executives and legislators. In a crisis the initial stress is on elected executives (President, governors, county commission chairs, mayors, etc.) They are the decision makers who must act and communicate in a crisis. The primary challenge for such executives is the constant need to balance what is necessary to deal with a crisis as opposed to what is "popular". While good response is usually a positive thing, sometimes decisions

necessary to a good response must infringe upon the rights, convenience and interests of members of the public. Decisions to impose curfews, to limit sales of certain items, to force evacuation or closure of businesses and, certainly, involuntary quarantine, are significant measures which may be necessary, but extremely unpopular.

While the role of members of Congress and state and local legislative bodies is less direct, they are key players as well. This is especially true when it comes to policy issues and recovery efforts. One of the most important roles of congressional members involves the process of obtaining Federal declarations after disasters. Congressional and legislative officials also play a critical role in constituent services after a disaster in helping citizens and local governments deal with the rules and policies involved in recovery programs. Ultimately, any changes related to disaster policy become a legislative initiative and the interest and understanding of the implications of such policy by these elected officials is critical.

Likewise, the involvement of political staffers and policy assistants in disaster-related activities and discussions is an important factor. Most political staff members are not routinely involved in such matters and only become so when the attention of their elected boss is directed there as a result of an event. The ability of state and local emergency managers to make contact with and provide valuable information and insights to staff members is an often-overlooked strategy which will bear considerable benefit during future disasters.

Politics can have Disastrous Consequences: Just as politicians and the political environment can be affected by a disaster, our response and recovery actions are almost inevitably driven, in part, by political considerations. Sometimes these political considerations can produce very negative consequences. These consequences can range from mere inconveniences (tours by elected officials of disaster sites) to major interference in the accomplishment of response and recovery objectives (lack of funds, refusal to grant necessary authority, etc.) On rare occasions, these consequences can result in illegal or unethical actions (use of disaster powers for personal gain or influence.)

It is important for local emergency managers to become aware of the potential for such political consideration to get out of hand and be able to devise tactful strategies for dealing with them. Well-established emergency operating plans and processes, for example, go a long way toward lessening the "politicization" of disaster response and recovery activities. Frequent orientation, training and exercising also will help elected officials understand the importance of pre-established roles, responsibilities and relationships and the necessity of operating as a team with a plan when disaster strikes. This necessity of having a plan brings us to the final principle.

Politicians, Like Nature, Abhor a Vacuum: For an emergency manager working to "get a handle" on the political dimensions of a disaster situation, this principle may be the most important. While in a minority of cases, there may be unwanted and excessive political interference in disaster operations, experience of most of our colleagues is that

as long as things are under control and there is a cogent, integrated effort during the response and recovery, political operatives are content to "play by the rules". It is generally when there is a real or perceived lack of control or coordination and things either are or appear to be in chaos, that political leaders tend to "take charge". On some occasions, this might even be beneficial, but more often than not, the results are not positive.

Most often, we, as emergency managers, have the power to determine our own fate in dealing with the political side of disaster activities. This power is relatively simple. We need to be as professional as we can be. We need to understand the emergency management process and principles and be able to communicate them – before, during and after the disaster strikes. We need to make sure that our plans are sound, complete and flexible to deal with the contingencies which inevitably occur during a disaster event. In this respect, as in all of emergency management work, the establishment of good relationships prior to the event is crucial. This is no less true when it comes to the political players. An additional consideration is to establish good prior relationships with the local media, since political actions are most often reactions to public perceptions as influenced by the media.

The bottom line is that we need to do our jobs professionally and have developed a strong framework of coordination and understanding before disaster strikes. Remember, if you provide a leadership vacuum during times of crises, the political leadership will, either by desire or necessity, fill it. We ignore these political principles at our own and our communities' peril.

FORESEEING THE UNTHINKABLE
Lessons Learned from Contingency Planning in Nepal

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Hazards in Nepal

"CNN July 3, 2015: 'A major earthquake hit Nepal at 8.37 this morning, local time. The Kathmandu Valley is severely affected though it seems like the local government is managing the disaster efficiently. Shortly after the disaster, contact was established between the UN Emergency Operations Centre and the local government. Search & rescue operations were started immediately with help from volunteers, and advanced medical posts have been set up around the city area in order to cope with the still increasing demands for medical treatment from the many casualties dug out from the rubble. Nepal has a history of earthquakes and has spent the last ten years improving its emergency preparedness and disaster response capacity, and, judging by the initial response today, the efforts seem to have borne fruit." (Joergensen & Ladegaard, 2002, 25).

The above imaginary media coverage depicts how two interns in the Emergency & Humanitarian Action Programme of the World Health Organisation (WHO) in Nepal envisage a future disaster in the country. Although the management aspects may be wishful thinking, the scenario is a painful reminder of the fact that Nepal is ever exposed to the threat of a major earthquake. Due to its location in the seismically active Himalayan mountain belt, the disaster history of the kingdom contains a significant record of destructive earthquakes. In the 20th century alone, four earthquakes killed a total of more than 11,000 people. Most prominent among them is the Great Bihar Earthquake – which could equally well have been termed the Great Kathmandu Earthquake - in 1934 measuring 8.4 on the Richter scale. The most troubling fact of Nepal's 750 year seismic record is a recurrence period for major earthquakes of only 75 years, suggesting that a devastating earthquake is inevitable in the long run and likely in the near future (NSET & GHI, 1999a, 8). Due to population growth, increased population density, widespread poverty, poor construction practices and limited response capacity, the catastrophic consequences of a future seismic event would be unthinkable.

The findings of the Global Earthquake Safety Initiative, organised by GeoHazards International and the United Nations Centre for Regional Development, provide fresh evidence of a nightmarish scenario. Among 21 highly vulnerable cities around the world, Kathmandu is considered the most dangerous place to live due to the lethality of buildings and insufficient medical and general preparedness. The city not only poses the highest risk of casualties in absolute numbers but also the highest per capita risk (GHI & UNCRD, 2001, 16-17). At the empirical level, the Gujarat Earthquake in neighbouring

India in January 2001 accentuated the need of assessing likely consequences and testing management systems. It is encouraging that the Ministry of Home Affairs (MOHA) and Ministry of Health (MOH) have authorized several studies investigating the likely consequences of a major earthquake (e.g. Nippon Koei Co. Ltd. & OYO Corporation, 2001 and WHO & EDCD, 2002).

Although earthquakes rightly should be perceived as the overriding natural hazard, Nepal's climatic conditions and topographic features are conducive to disasters of different types and magnitude. High-altitude hazards such as avalanches, hailstorms and glacial lake outburst floods occur in the northern mountainous regions, and floods, landslides, windstorms, thunderbolts, fires and epidemics affect the hilly central and flat southern parts of the country. Recent disaster statistics from MOHA reveal that the accumulated impact of floods, landslides and epidemics is the most persistent threat to the country (MOHA, 2001, 10).

Among man-made disasters, road traffic accidents and domestic fires are common events. Though complex emergencies were largely unthinkable a few years ago, UN has recently undertaken several initiatives to address the internal political conflict in the country. The seven years old insurgency has claimed approximately 7500 people and can no longer be dismissed as a law and order problem. However, the continuing instability among the political establishment has compounded the situation and made it difficult to reach sustainable political solutions.

Disaster Management in Nepal

While the authorities have gained valuable experience in coping with general and public health consequences of communicable diseases, road traffic accidents, fires, floods and landslides, the experience of dealing with massive, irregular, and sudden onset disasters such as earthquakes is limited. The disaster management system is governed by the Natural Disaster Relief Act of 1982, which has been amended twice. The Act makes provisions for official inter-agency disaster relief committees at the central, regional, district and local levels (MOHA, 2001). The authorised key institution for disaster management is MOHA. Although the Ministry formulated an ambitious *National Action Plan on Disaster Management in Nepal* in 1996 (MOHA, 1996), the focus remains on immediate rescue and relief rather than on long-term prevention and mitigation.

NGOs and the international community have taken a more progressive approach to disaster management. The notion that the magnitude of disasters is greatly determined by the vulnerabilities and capacities of the affected population has gained general acceptance. In response to a national flood disaster in 1993, three sectoral working groups with representatives from UN, the government, donors and NGOs were established. The working groups covered the areas of food & agriculture, health, and logistics and assisted the government in identifying response priorities. Although UNDP did a commendable job in attempting to keep the working groups alive, they eventually entered into a dormant stage until the Disaster Health Working Group was revitalised in

October 2000. During and after the severe floods and landslides in the monsoon season of 2002, several initiatives were undertaken to bring the two other working groups back to life again.

The most significant initiative in the country is the Kathmandu Valley Earthquake Risk Management Project, which is funded by USAID, administered by the Asian Disaster Preparedness Center and implemented by GeoHazards International and the National Society for Earthquake Technology – Nepal (NSET-Nepal). The implementers and a long row of collaboration partners conceptualised *The Kathmandu Valley Earthquake Risk Management Action Plan*, which was published in January 1999. The plan aims to assist the government and concerned agencies in reducing Kathmandu Valley's earthquake risk over time (NSET-Nepal & GHI, 1999a, 5). Apart from scenario building and loss estimates, the Action Plan contains an impressive number of sound recommendations along with a clear implementation strategy. NSET-Nepal is still vigorously raising awareness and mitigating risks. Due to competent and dedicated emergency planners, the Society is remarkably successful in organising national awareness campaigns such as earthquake safety days and in implementing school and other earthquake mitigation programmes.

The UN Planning Process

While recognizing that disaster management is a national responsibility, UN acknowledges that the humanitarian implications are universal concerns. At the end of 1999, UN Nepal initiated a collaborative contingency planning process to counteract the above hazards. The UN Disaster Management Team (UNDMT) played a lead role in the efforts and continues to advise the Designated Official on all natural hazard related issues.

In order to live up to the UN's humanitarian mandate and institutional responsibility, UNDMT decided to plan for a catastrophic event that would - by implication – also cover small-scale disasters. In consideration of the potential damage and humanitarian needs, UNDMT adopted a large-scale earthquake as its worst-case scenario. Although the next great earthquake is unlikely to have the same magnitude and location as the 1934-quake, the soft ground of Kathmandu Valley makes it reasonable to assume that the shaking pattern will not differ radically. Such a scenario has been thoroughly investigated by the Kathmandu Valley Earthquake Risk Management Project. According to their prediction, the human loss in Kathmandu Valley could be 40,000 deaths and 95,000 injured. At the same time, more than 60% of the existing buildings are likely to be destroyed, many beyond repair, leaving 600,000-900,000 residents homeless. In addition, 95% of the water pipes and 50% of the pumping stations, treatment plants etc. could be seriously damaged, hampering water supplies for several months. Moreover, the infrastructure, electricity supplies and means of communication are likely to be severely affected (NSET-Nepal & GHI, 1999a, 9-10) (2).

The scale of such a disaster combined with the fact that the national disaster management system is still in its infancy compels the UN and its partners to pay serious attention to mitigating potential consequences by institutionalising proper preparedness and response mechanisms. The main instrument to achieve this goal is a contingency plan developed by emergency focal points in WHO and UNDP under the supervision of UNDMT and guidance of international disaster managers. In accordance with the humanitarian mandate, the overall objective of the UN plan is to ensure that human survival and well being, particularly of the most vulnerable groups, are assured in whatever emergencies develop (UNDMT, 2001, 2).

The then Prime Minister formally launched the first part of *UN Nepal's Disaster Response Preparedness Plan* on the UN Day in October 2001. Part I provides a hazard and vulnerability analysis along with policy guidelines and selective Terms of Reference for a response operation. The two additional parts of the plan are rolling documents that are under continuous refinement. Part II presents action plans prepared by inter-agency clusters for an internal response and part III agency plans for an external response. Part II targets UN staff and their dependants and part III concerns the population at large. The strategy to achieve a coherent and coordinated disaster response is to initially give priority to part I and II of the plan, thereby making sure that agency plans in part III fit into an inter-agency framework of sectoral collaboration (UNDMT, 2001, 5).

The earthquake threat is considered serious enough to warrant continuous readiness. At the same time, UN Nepal aims to be instrumental in developing standing readiness to provide initial survival assistance for up to half a million people (UNDMT, 2001, 17-18). To facilitate the process of becoming operational, eight inter-agency clusters have been established covering the areas of assessment, awareness raising & training, communications, food & water, health, logistics & shelter, search & rescue and wardens (UNDMT, 2001, 20). With the exception of assessment, these clusters are primarily responsible for managing the internal aspects of a disaster response although they may eventually contribute to external planning and collaboration in related sectors.

Even though significant progress has been made in terms of establishing an Emergency Operation Centre, organizing Disaster Awareness Days and distributing Earthquake Survival Kits to staff, considerable challenges exist in the process of becoming operational. At a UN emergency planning workshop in June 2001, the participants were in favor of maintaining voluntarism as the basic principle in UN's emergency planning process to ensure full commitment from staff, which was perceived as a precondition for a participatory approach. But the participants also strongly felt a system of recognition (revision of Terms of Reference and inclusion in performance evaluations) and reward (attractive training opportunities) should be institutionalized to formalize the voluntarism and encourage emergency planners to carry out their duties. At the same time, the participants concluded that the planning process had reached a critical stage, where financial commitment from UN agencies were required to operationalise the UN plan and eventually develop standing readiness (Thapa & Kjaergaard, 2001). Since these

suggestions have not been put to practice, a rationalization of the cluster system was presented as a more pragmatic recommendation at the last UN Disaster Awareness Day (Higgins, 2002, 15).

The Health Sector Planning Process

One of the spin-offs of the UN planning process was an increased interest in contingency planning among national counterparts. The health sector proved particularly receptive to engagement in a sectoral planning process. The initial momentum was created by a favorable combination of widely perceived needs among day-to-day health managers of outbreaks and casualties as well as resourceful individuals with strong institutional backing. A strategy of identifying committed key-persons from civil society and mobilizing them within an institutional framework that would increase the authorities' accountability was an important notion among some of the initiators. Another prevalent view was to build on existing structures rather than creating arbitrary ones.

For that reason, the Epidemiology & Disease Control Division (EDCD) of the Department of Health Services and WHO decided to revitalize the Disaster Health Working Group (DHWG). Since October 2000, regular meetings and workshops have been held to air concerns, discuss strategies and disseminate findings. The group is chaired by senior representatives from MOH and the Department of Health Services and consists of members from the government, UN, donors, NGOs, health institutions and hospitals. The single most important decision in the planning process was to institutionalize a working-level DHWG Secretariat consisting of committed members from MOHA, MOH, Department of Health Services, OFDA / USAID, GTZ, NSET-Nepal and WHO. This Secretariat has proven to be a powerful think-tank, where initiatives and publications are thoroughly discussed before being presented to a larger audience.

In recognition of the UN planning process, the DHWG decided to adopt the UN planning format with certain adaptations such as a stronger focus on preparedness and health. By focusing on all major hazards including earthquakes, epidemics, floods, landslides and political violence, the health sector plan is more multi-focused than the UN plan. Since the modifications remain within reasonable limits, the general planning format could be launched as a national template upon government approval. Similar to the UN planning process, part I of the *Emergency Preparedness and Disaster Response Plan for the Health Sector in Nepal* was published in May 2001, while the inter-agency and agency-specific plans in part II and part III remain at working level. Inter-agency plans need to be revised and agency plans collected and compiled. Although several members of the Secretariat are eager to see the final version of the health sector plan, even part I remains a rolling document that has been under revision for months. Developing standing operational procedures would be the next logical step eventually leading to a future publication with the title *Emergency Procedures for the Health Sector in Nepal*.

As in the UN plan, there is a strong emphasis on becoming operational: "In order to be able to live up to its institutional responsibility, the health sector must immediately

develop standing readiness to confront the most threatening disasters" (DHWGS, 2001, 23). To achieve this goal, the health sector plan operates with six inter-agency task forces (similar to UN clusters) covering the areas of emergency preparedness, hospital preparedness, physical assessment, disease control, disaster response, and political recognition & co-ordination. Since the dividing line between internal and external planning has less relevance to the health sector, the task forces are occupied with assisting the population at large. Due to enormous challenges, lack of time and resources, and possibly limited recognition at highest official level, the operational achievements remain rudimentary. Up to now, the DHWG has mainly decided to prioritise the following five types of response: rapid health assessment, emergency relief, mass casualty management, curative care and fundraising (DHWGS, 2001, 34).

In September 2001, the DHWG Secretariat unanimously agreed to key recommendations for the future direction of the ongoing emergency planning in the health sector. These recommendations were officially sent to MOH and included among others the following issues: 1) Emergency preparedness and disaster management should be included in the *10th Five Year Plan*. 2) A National Disaster Management Council under the chairmanship of the Prime Minister should be established in order to facilitate inter-ministerial collaboration. 3) Adequate financial commitment from MOH is required in order to proceed with the emergency planning process and develop standing readiness. 4) Higher building standards than average building codes should be introduced for critical health facilities and hospitals in view of their strategic importance in any disaster response operation. 5) Emergency preparedness and disaster management should be included in medical curricula at all relevant academic institutions.

Supportive Program Activities

To support the comprehensive health sector planning process and address related mitigation issues, WHO has undertaken several initiatives in collaboration with the DHWG Secretariat, EDCD and MOH. While covering a wide range of activities, the focus of the WHO Emergency & Humanitarian Action Programme in Nepal remains on human resources and capacity building in order to enhance the health sector's capability of coping with emergencies. Apart from assessment, planning and mitigation, this involves setting up and running training seminars and simulation exercises, and developing and adapting various types of training materials. With the exception of monitoring and coordination efforts during the critical floods and landslides in 2001, the implementers have been able to commit themselves to preparedness rather than response. It has created an opportunity to approach health sector emergency preparedness from a broad developmental perspective rather than from a narrow response and recovery starting point. The main achievements can be summarised in the following three areas of intervention initiated to supporting the planning efforts:

1) Mass Casualty Management Simulations

Although emergency departments in major hospitals are used to dealing with a sudden inflow of up to fifty casualties due to regular bus accidents and the recent political

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violence, there is little capacity for coping with the predicted number of injured in an earthquake scenario. To familiarize key actors in the health sector with mass casualty management procedures, a comprehensive training programme focussing on the management and logistical aspects of on-site triage (3), field stabilization and medical evacuation has been ongoing since 2000. The theoretical knowledge is inspired by the Pan American Health Organisation (PAHO), which has considerable expertise in this particular field. Initially, a sophisticated computer-software Multi-User System for Training Emergency Response (MUSTER) with a specific earthquake scenario for Nepal created great interest in simulations, which allowed health sector staff of various designations to practice mass casualty management procedures in an inter-active network (4). Following the success of this medium, low-tech desktop exercises and full scale mock drills utilising simulation tool kits have been designed and field-tested with support from NSET-Nepal and Nepal Red Cross Society. To date almost one thousand health sector staff have been exposed to the new training methodologies. In collaboration with MOH, a national template for a triage card has simultaneously been designed and thousands of samples are in the process of being distributed to health facilities in the country. More simulations are planned for 2003 and follow-up proposals are under consideration.

2) Seismic Vulnerability Assessment of Hospitals

In recognition of the risk of damaged health facilities, several agencies have implemented seismic vulnerability assessments of hospitals in Kathmandu. In collaboration with NSET-Nepal, the US Army conducted a structural assessment of Bir and Teku hospitals in 1998. Two years later, a team from New Zealand conducted a non-structural assessment of Bir Hospital. In 2001, WHO and the national health authorities agreed there was a need to undertake a more comprehensive evaluation of the physical integrity of hospitals. EDCD and MOH therefore authorized a structural assessment of the major hospitals in the valley. An experienced structural engineer affiliated to PAHO implemented the study of 14 hospitals in collaboration with NSET-Nepal. The assessment involved both quantitative and qualitative analysis of hospital buildings and provided information essential to the development of realistic contingency plans. For rare earthquakes of high intensity, only 10% of the existing hospitals were assessed to remain partially functional, whereas 60% would be out of service in complying with a life-safety performance, and 30% of the structures may collapse (WHO & EDCD, 2002, 13). These worrying findings were presented to the Minister of Health and senior government officials and hospital staff at a high-level meeting in December 2001. The national health authorities, WHO and NSET-Nepal have agreed on a follow-up proposal paying more attention to non-structural aspects and to hospitals outside Kathmandu Valley. The new assessment is expected to commence in the near future and should eventually lead to the following publication: *Guidelines on Non-structural Earthquake Safety for Health Facilities.*

3) Promotion of Best Public Health Practices in Emergencies

Public health in emergencies is a core area of intervention for EDCD and WHO. One of the challenges is to confront prevalent myths of the association between health risks and

natural hazards. PAHO has gone a far distance in dissociating epidemics from earthquakes, downplaying the health hazards of dead bodies and warning against ill-founded short-term mass immunisation campaigns (5). In order to disseminate these findings, WHO and EDCD designed a poster on myths and realities of natural disasters. Since injuries can be perceived as the most urgent public health issue in a worst-case earthquake scenario, WHO produced a training video on mass casualty management for health sector personnel. Furthermore, *Guidelines on Emergency Preparedness and Disaster Management for Hospitals* (Bista, Devkota & Kjaergaard, 2001) was developed in English and translated into Nepali to provide simple operational recommendations for health facilities at field level. Lately, WHO emergency library kits were procured for distribution to strategic institutions in the country.

Lessons Learned

The lessons learned from three years of contingency planning in Nepal can be summarized in the following five arguments:

1) Earthquake Awareness does not Necessarily lead to Contingency Planning

One explanation for lack of emergency preparedness could be that disasters generally are viewed as acts of God and thereby removed from the development agenda. Combined with fatalism, this could easily be the case at community level. However, the human dimension of disaster management seems well comprehended among the literate population and development workers. This is particularly evident in Kathmandu Valley due to annual earthquake safety days with a high media profile and a widely circulated earthquake scenario (NSET & GHI, 1999b). The uneasy co-existence of earthquake awareness and lack of emergency preparedness could alternatively be explained by rational miscalculations and limits of rationalisation. The miscalculations could stem from a tendency to view emergency preparedness as a luxury – especially when daily human beings are dying due to uncovered basic needs. It is not always easy to convince busy officials about the cost-benefit potentials of emergency preparedness. The limits of rationalisation are particularly visible outside the academic world, where bureaucracy, patronage and nepotism are heavily involved in any planning process. A passion for written plans rather than operational measures may also be at play among senior managers and policy makers. Perhaps the above arguments could be radicalised in the following statement: even contingency planning does not necessarily lead to operational capacity. Cynically viewed, this seems to be the case in both the UN and the health sector planning process – but hopefully only in the short-term.

2) There are no Shortcuts in Contingency Planning

Contingency planning guidelines are useful when initiating a planning process, but should never be uncritically adhered to as universal templates. Each planning process must be properly contextualised and implemented by the concerned actors in order to generate useful plans and create accountability. As such, there is no shortcut to emergency preparedness. But even if the above pitfall is avoided, the argument remains

valid since emergency preparedness is a developmental activity that necessitates continuous efforts from a committed group of planners. Although energetic champions may facilitate the process by providing technical assistance and recording the process, proper coordination among various actors remains a time-consuming and exhausting task. It is imperative for policy makers and senior managers to acknowledge that no major results should be expected within a short timeframe. Emergency planners must in other words not be subdued by implementation pressures and bureaucratic procedures, which are likely to result in loss of focus, limited creativity, lack of follow-up, and eventually failed sustainability. However, all said and done, regular meetings and a realistic timetable do encourage planners to perform their duties in a timely and efficient manner.

3) Contingency Planning has its Momentums

Since contingency planning is a prolonged activity, the process is bound to have its ups and downs depending on both external and internal factors. Tragic disasters may have a positive side effect by highlighting the importance of contingency planning. This was for instance the case when the Gujarat earthquake in January 2001 led to a collective realisation of the necessity to enhance emergency preparedness in Nepal. Internal factors in terms of a positive working environment, coloured by mutual respect and a sense of humour, are also likely to influence the planning. Particularly in an inter-agency environment, where institutional cultures may differ and tolerance is needed. Moreover, it is worth bearing in mind that planners often have several duties among which emergency planning may not always be considered a priority. A good collaboration within UN, a supportive WHO Representative, willingness in EDCD and MOH to undertake new initiatives, and trustful interaction with dedicated managers in NSET-Nepal have greatly facilitated the above planning processes. Without a properly institutionalised body of committed emergency planners meeting on a regular basis, the planning process is unlikely to gain momentum. The fact that inter-agency collaboration can change from a constructive process to a futile undertaking if one or more of the actors attempt to monopolize the process is also necessary to keep in mind. Only a favourable combination of external and internal factors may result in successful contingency planning.

4) Contingency Planning must be Creative

Flexibility and creativity are needed to comprehensively address the issues at stake. A changing hazard scenario in Nepal during the past three years has necessitated a revised focus in terms of higher priority to complex emergencies. Quick shifts between top-down and bottom-up approaches may also be needed to illustrate the relevance of contingency planning at both policy and field level. Planners should thus be ready to cover a broad variety of activities ranging from high-level policy making to field level preparedness while maintaining the adopted scenario as the common denominator. It is recommendable to segregate the scenario into its various components to make disaster response manageable and convince actors of its applicability. An estimate of 95,000 injured may for instance seem beyond operational limits, whereas a reduced estimate for a specific locality can facilitate the planning. Focus on hospitals may also help to convince health authorities of the importance of building codes and their own responsibility to seismically

assess critical facilities. It is in other words necessary to allow the context to determine priorities. Ultimately, policymakers, planners and implementers need to be ready to compromise institutional bindings to achieve a common goal by acting as, for example not only WHO employees but also as UN representatives and citizens of Kathmandu Valley.

5) Contingency Planning must be Integral

Contingency planning must be given due attention by policy makers and senior managers. Only high-level commitment and resource allocation can ensure an integral planning exercise with an adequate profile. While lip service may result in a contingency plan, it will rarely result in a proper planning process and never in operational capacity. The risk of compartmentalisation relates to the traditionally clear demarcation line between development thinking and emergency relief. It often leaves emergency preparedness in a grey zone, or perhaps even a void, since it doesn't fall under either of the two headings. However, donors have lately encouraged proposals acknowledging the link between our everyday practices and the risk of disasters. Exactly like health is an integral part of development - and should be approached as such - emergency preparedness ought to be an integral aspect of any development and health related programme. As stated in the UN plan: "...disasters should not only be evaluated in terms of their immediate destructive effects but also in terms of their potentials as windows of opportunity for future development" (UNDMT, 2001, 2). The fact that emergency preparedness is another crosscutting development issue, which deserves as much attention as e.g. human rights, environment and gender, could easily make it a new buzzword with few practical implications. So the real challenge remains how to move from a focal point approach to an integral approach without loosing momentum. Gradual transfer of ownership may facilitate the process along with the above recommendations.

The Way Ahead

Despite the above reservations, there are clear indications that emergency preparedness has gained ground within UN, in WHO and among national counterparts. International attention and a more favorable staffing situation may create new opportunities to take the planning several steps further. Perhaps Nepal could become a regional model in terms of contingency planning. To materialize this vision, the planning process needs to be supported at two levels: At policy level and at the operational level. Interventions in both areas are likely to feed back into the planning and provide new stimulus to a process that would otherwise stagnate. It is worth remembering that a non-operational emergency plan is only acceptable as a temporary arrangement while moving from awareness towards preparedness (6). The only way to protect planning from status quo and contingency plans from being shelved is to keep on moving forward. We should never forget that only the future will reveal the life- and cost-saving implications of our undertaking.

At the political level it is evident that a more aggressive approach is needed from all stakeholders to confront and counteract the prevalent hazards in Nepal. Disaster management should be transferred to the Prime Minister's Office to give adequate attention to the matter and facilitate collaboration between line ministries. At the same

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time, adequate resource allocation and strong contingency planning must transform the official focus from rescue and relief to prevention and mitigation. As for the health sector emergency planning process, it needs to be officially incorporated into the national disaster management system by a strong legal base, which promotes total risk management and provides institutional backing for the planners involved. The UN plan could pave the way by moving beyond planning and enhancing operational capacity to ultimately reach standing readiness.

At the operational level, there is an immediate need to significantly increase the current level of emergency preparedness by resource mobilization and proper coordination. Pre-positioning of essential supplies and equipment at strategic locations is an unavoidable aspect of any solution along with better information and coordination mechanisms between various stakeholders. An enhanced system of transparency and accountability would encourage donors to get involved. The best way to achieve this goal is to supplement the ongoing national emergency planning efforts at UN and in the health sector by similar exercises in all relevant line ministries. Only a comprehensive system of coherent plans at the inter-sectoral, inter-institutional and agency level can ensure sufficient response capacity, which brings us back to contingency planning as a prerequisite for realizing the management aspects of the imaginary CNN scenario.

Notes

(1) The views expressed in this article represent the author and do not reflect the opinions of WHO, DHWG or UNDMT.

(2) The level of damage during an earthquake is affected by factors such as magnitude, intensity, duration, population density, preparedness, and mitigation measures. Since it is a difficult task to create a reliable scenario, all numbers should be read with caution.

(3) Triage derives from the French verb "trier" meaning "to sort" indicating that the purpose of triage is to prioritise between acute and non-acute victims in order to minimise loss of life and disabilities.

(4) The Danish company IFAD has produced the MUSTER software. More information is available at the following website: http://www.ifad.dk

(5) de Ville de Goyet, C. (2000) Stop Propagating Disaster Myths. *Lancet* 356: 762-764.

(6) In some cases it may be strategically wise not to immediately outline all budget implications of the planning exercise as it could discourage policy makers from undertaking contingency planning.

References

Bista, M. B., Devkota, U. N. and Kjaergaard, Erik (2002) *Guidelines on Emergency Preparedness & Disaster Management for Hospitals.* EDCD & WHO, Kathmandu, Nepal.

Disaster Health Working Group Secretariat (2001) *Emergency Preparedness & Disaster Response Plan for the Health Sector in Nepal – Part 1.* EDCD & WHO, Kathmandu, Nepal.

GeoHazards International & United Nations Centre for Regional Development (2001) *Global Earthquake Safety Initiative Pilot Project – Final Report.* GHI, Palo Alto, California, USA.

Higgins, Dicken (2002) *DAD 2002 – United Nations Nepal Disaster Awareness Day 2002 9 October* (unpublished). Internal UN Report, UN Nepal, Kathmandu, Nepal.

Joergensen, Lise Gandloese & Ladegaard, Trine Sandberg (2002) *Emergency Preparedness in Nepal – An Internship Report from Emergency and Humanitarian Action in the World Health Organisation* (unpublished). International Development Studies, Roskilde University, Roskilde, Denmark.

Ministry of Home Affairs (1996) *National Action Plan on Disaster Management in Nepal.* MOHA, Kathmandu, Nepal.

Ministry of Home Affairs (2001) *Disaster Management System in Nepal.* Department of Narcotics Control & Disaster Management, MOHA, Kathmandu, Nepal.

National Society for Earthquake Technology - Nepal & GeoHazards International (1999a) *The Kathmandu Valley Earthquake Risk Management Action Plan.* NSET-Nepal, Kathmandu, Nepal.

National Society for Earthquake Technology - Nepal & GeoHazards International (1999b) *Kathmandu Valley's Earthquake Scenario.* NSET-Nepal, Kathmandu, Nepal.

Nippon Koei Co. Ltd. & OYO Corporation (2001) *The Study on Earthquake Disaster Mitigation in The Kathmandu Valley, Kingdom of Nepal – Draft Final Report.* JICA & Ministry of Home Affairs, Kathmandu, Nepal.

Thapa, Man B. & Kjaergaard, Erik (2001) *UN Emergency Planning Workshop* (unpublished). Internal UN Paper, UN Nepal, Kathmandu, Nepal.

United Nations Disaster Management Team (2001) *UN Disaster Response Preparedness Plan – Part 1.* UN Nepal, Kathmandu, Nepal.

World Health Organisation & Epidemiology & Disease Control Division (2002) *A*

Structural Vulnerability Assessment of Hospitals in Kathmandu Valley. EDCD & WHO, Kathmandu, Nepal.

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TSUNAMI PREPAREDNESS IN
COASTAL WASHINGTON STATE

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INTRODUCTION

Over the past few decades, considerable improvement in the understanding of tsunami risk in Washington has emerged from researching historic events (Wilson & Torum, 1972) and the paleotsunami record (Atwater, 1992; Atwater et al., 1995; Walsh et al., 2000). The largest and most comprehensively researched historic tsunami to impact the southern Washington coast followed the March 27, 1964, Alaskan earthquake. Wave heights of up to 14 feet were recorded, resulting in damage to bridges, boats and some port facilities along the outer coast, Grays Harbor and Willapa Bay (Walsh et al., 2000).

In earlier times there is considerable evidence for a large Casacadia subduction zone earthquake and consequent tsunami just over 300 years ago (1700 A.D.) (Atwater, 1997). Wave heights in excess of 20 feet and regional subsidence of 5 feet are thought to have affected a wide area of the Washington coast. Based on modeled tsunami inundation from scenarios for two hypothetical earthquakes on the Cascadia subduction zone similar to the 1700 A.D. event, a tsunami hazard map has been published as part of the National Tsunami Hazards Mitigation Program (Walsh et al., 2000)

Since the mid 1990's the State of Washington in association with the U.S. Natural Tsunami Mitigation Program has undertaken a wide range of mitigation activities (Bernard, 2001, Jonientz-Trisler & Mullin, 1999). Consequently, information in several media (books, posters, pamphlets, school kits, mugs, and magnets) has been distributed to the communities surveyed here (figure 1). Warning and evacuation signs have been erected in prominent positions, and maps and public displays illustrating the tsunami inundation zone for the southern Washington coast have been distributed to the community. This study was undertaken to assess the influence of these activities on tsunami hazard preparedness.

METHOD

Data were collected using a questionnaire derived from a theoretically robust and empirically tested process model of preparedness (Paton, 2000; Paton, et al., 2001; Paton et al., 2003). Details of the scales used and their sources can be found in Paton et al. (2003). During August and September 2001 some 1169 questionnaires were distributed to households in communities with known and objective vulnerability to tsunami hazards (Figure 1).

A total of 211 were returned, giving a return rate of 18%. The data obtained is moderately representative sample of residents from the areas surveyed. On average, people had lived in their community for 20 years, and had resided within their current house for 12 years.

Hazard Preparedness

A central goal of public hazard education is encouraging household adoption of measures that facilitate their capability for coping with the temporary disruption associated with hazard activity and with minimizing damage and insurance costs. Consequently, the starting point for this paper is the analysis of levels of preparedness within households in areas with an objective vulnerability to tsunami hazard effects.

The contents of most preparedness scales describe items indicative of a potential to influence coping with disruption from hazard activity. However, the objective analysis of hazard preparedness, and, in particular, whether adoption decisions are driven by underlying attitudes likely to ensure sustained preparedness, requires that a distinction be drawn between activities that households might routinely adopt and those required to safeguard families from hazard events (e.g. earthquakes, tsunamis). The conflation of, for example, processes that reflect household maintenance, lifestyle choices, or everyday safety with those responsible for preparing for natural hazard activity can produce misleading estimates of preparedness and of the attitudes of community members to mitigation (Paton et al., 2003). For example, people may keep a torch and batteries in case of power cuts, have a portable radio for their daily use, or have several days supply of food because of their usual shopping habits, and so on. While such items do have additional utility in regard to dealing with hazard-related disruption, the fact that they may not reflect decisions undertaken <u>specifically</u> in regard to hazard preparedness means that their role as a primary indicator of preparedness is questionable (Paton et al, 2003). Activities that are more indicative of decisions to prepare for infrequent, but potentially more destructive and disruptive hazards are described in table 1.
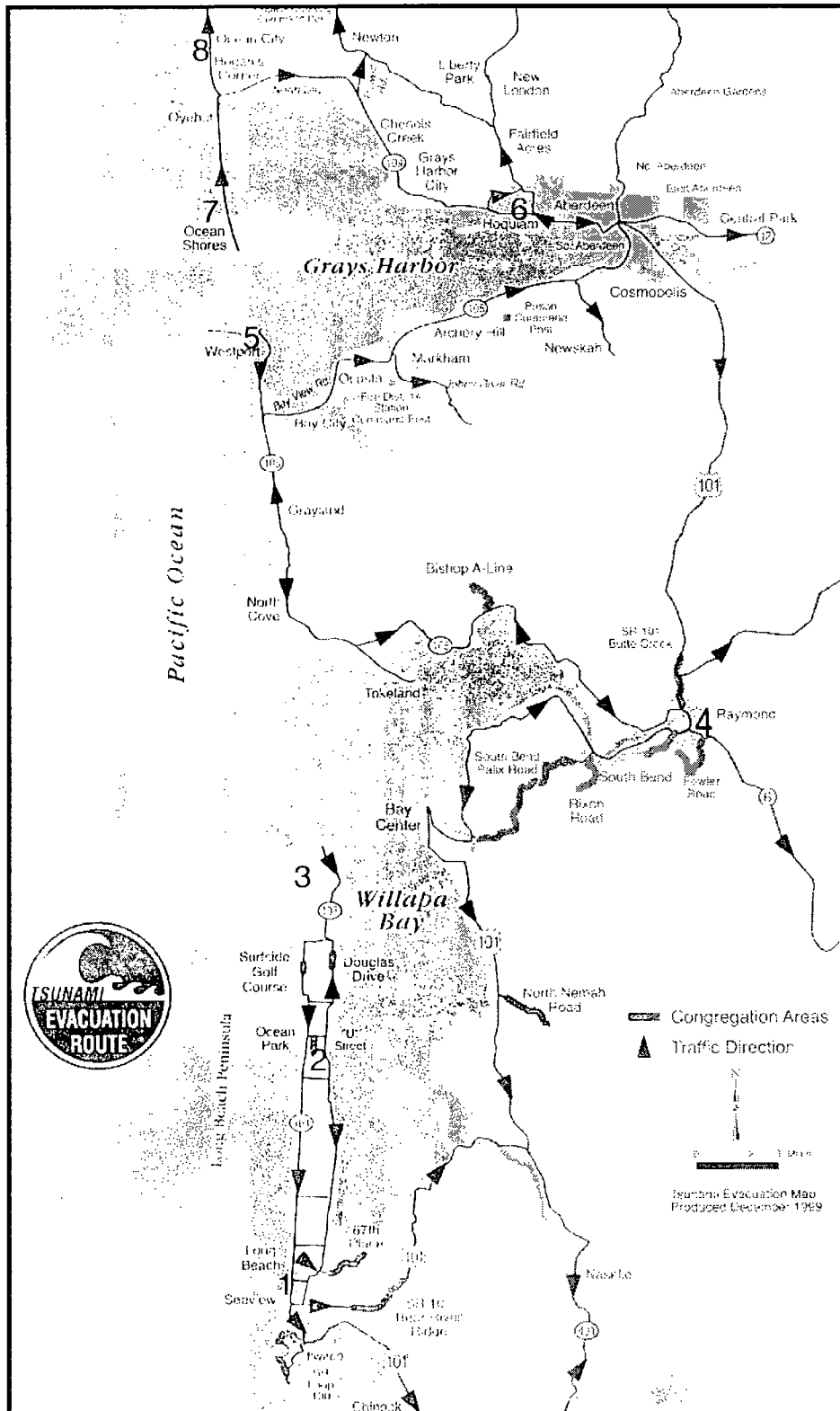
Figure 1: Survey locations: 1) Long Beach/Seaview, 2) Ocean Park, 3) Surfside/ Oysterville, 4) Raymond, 5) Westport, 6) Hoquiam, 7) Ocean shores, 8) Ocean City. Map also shows planned evacuation routes as presented in Grays Harbor and Pacific Counties tsunami hazard brochure.

These data indicate low to moderate levels of preparedness. This interpretation is reinforced when the number of items adopted is considered. Of the 11 adjustments listed in table 1, the average number adopted was 2.66 (table 4). There exists substantial scope for improving levels of household preparedness. Interestingly, while 57% of respondents had ascertained the vulnerability of the area (which are all objectively vulnerable) in which they live (table 1), this knowledge did not translate into better preparedness.

Protect breakable household items	19%
Put strong latches on cabinet doors	7%
Add edges to shelves to keep things from sliding off	5%
Strap water heater	23%
Install flexible tubing to gas appliances	12%
Bolt house to foundation	31%
Pick an emergency contact person outside of the Northwest	28%
Buy additional insurance (e.g. home)	33%
Find out if you are in an area particularly vulnerable to a disaster	57%
Have home inspected for preparedness	3%
Talked to family members about what to do if a tsunami warning is heard	48%

Table 1:
Hazard preparedness indicators and the proportion of residents adopting each.

Given the small sample size, the possibility that levels of preparedness are lower in those who did not respond cannot be discounted. This is an important finding in relation to the efforts expended on public hazard education and signals a need for a more searching analysis of preparedness. First, it is pertinent to assess how effective the public education process has been in regard to disseminating information.

The level of access to tsunami hazard information was high. A majority of respondents (62%) reported they had seen the tsunami zone map of the southern Washington coast. Furthermore, some 76% reported having heard or received information on tsunami hazards, and some 90% of those who had received information from more than one source felt that the information they had received from different sources was consistent. Consequently, low levels of preparedness cannot readily be attributed to lack of access to information.

These data reiterate the fact that while it is often assumed that providing the public with information about hazard activity will automatically facilitate preparedness (Smith, 1993), there is little empirical support for this relationship (Ballantyne et al., 2000; Johnston et al., 1999; Lindell & Whitney, 2000; Paton et al., 2000; Paton et al., 2003). Indeed, public hazard education programs can effectively reduce preparedness

(Ballantyne et al., 2000). There is thus good cause to examine the factors that influence adjustment adoption or preparedness.

While the receipt of information can stimulate the search for additional information (Mileti & Fitzpatrick, 1993), this does not appear to be the case here. Some 76% of respondents reported receiving information, but only 30% of them reported actively seeking additional information as a consequence. This discrepancy could reflect the possibility that information search behaviour (and preparedness) is influenced by the manner in which new information is incorporated into their pre-existing views (perceptions) of the hazard and its associated risk (Higgins & Bargh, 1987). If the assimilation of new information on hazard preparedness and warnings is to be encouraged, it is important to understand these interpretive processes. It is to a discussion of these that this paper now turns. An analysis of perceived preparedness can illuminate this issue.

Perceived preparedness

An important issue in this context concerns the extent to which people perceive themselves as being prepared, and how they compare themselves with other members of their community. Moderate to high levels of perceived preparedness were recorded (table 2), reinforcing the possibility that respondents' existing beliefs (rather than an objective appraisal of their preparedness) may have constrained their information uptake.

When asked about the level of preparedness in other members of their community, an interesting pattern emerged. Respondents tended to rate their preparedness as being significantly (F = 14.104; p< 0.01) better than that of other members of their community (table 2).

	Mean perceived preparedness	s.d.
Your household	2.41	0.82
Your community	2.48	0.81

Table 2: Residents perceived levels of preparedness (1 = very prepared – 5 not at all prepared).

These data are consistent with the operation of an 'unrealistic optimism' bias (Paton et al. 2000; Sjöberg, 2000) whereby respondents perceive themselves as less vulnerable, more skilful, or better prepared than average. This bias is anomalous since individuals cannot all be better than the average for the community as a whole.

This perceptual bias has important implications for risk communication. Basically, it means that although people may be aware of possible shortcomings in preparedness within their community (e.g., as a consequence of the public education campaign), they do not attribute this to themselves. In the context of this interpretive bias, people are

saying 'I believe I am better prepared than my neighbors, so all this information about hazards must be intended for them'.

Consequently, irrespective of the quality of the risk communication program, and even if residents appreciate a need for risk reduction activities, individuals are less likely to acknowledge or act on the information and recommendations contained in these initiatives since they are assuming, incorrectly, that it is intended for 'others'. Furthermore, there is evidence for the operation of another, complimentary interpretive processes here.

	direct encounter %	Experienced loss %
Flood	27.0	7.6
Storm with high winds	79.6	37.0
Earthquake	65.9	12.8
Volcanic eruption	24.6	3.8
Tsunami	6.2	0

Table 3: Experience of hazards and corresponding damage

One such process concerns how people extrapolate from the outcomes of their previous encounters with hazard activity a capability to deal with future hazard activity. A 'normalization bias' (Mileti & O'Brien 1993) results when people infer from an ability to cope successfully with (objectively) minor impacts a capability to deal with any future larger occurrence. The combination of high levels of hazard experience but low corresponding levels of experienced loss or damage (table 3) could result in a generalized normalization bias operating within this sample.

A final interpretive bias that may be operating here is risk homeostasis (Adams, 1995) This concept suggests that activities such as installing tsunami warning signs in prominent places could result in a reduction in the perceived risk attributed to this hazard and/or an increase in perceived preparedness. That is, by seeing these signs every day people progressively come to think that this is sufficient to lead them out of danger should a tsunami occur.

These interpretive biases could result in people overestimating their perceived preparedness and/or attributing the need for preparedness to others, reducing the likelihood of their attending to the information disseminated in public education campaigns (Paton et al., 2000). These are, however, not the only interpretive processes that could be influential in this context. Several factors have been integrated to constitute a process model of preparedness ((Paton, 2000; Paton et al., 2000; Paton et al., 2003). This model is used to frame the next part of this paper.

THE PREPAREDNESS PROCESS

In this model (figure 2), derived from an empirical analysis of earthquake preparedness (Paton et al., 2003), the motivators or precursors of preparedness are the level of risk attributed to a hazard and the perceived salience of hazard issues. The latter is measured using the construct of critical awareness (which assesses the extent to which people think and talk about hazards). Next, progress towards preparedness is determined by peoples' beliefs regarding whether individual efforts can mitigate hazard effects (outcome expectancy). Individuals are more likely to engage in behaviors when the outcome is valued and perceived as achievable. If favorable, it is peoples' beliefs regarding their personal capacity to act effectively (self efficacy) that influences whether they progress towards forming preparatory intentions. In addition, self-efficacy influences the effort and perseverance in risk reduction activities, an important factor given the rarity of hazard occurrence and the need for readiness activities to be sustained over prolonged periods of time. If intentions to prepare are formed, whether they are converted into actual preparedness then depends on several moderator factors. They are described in more detail below.
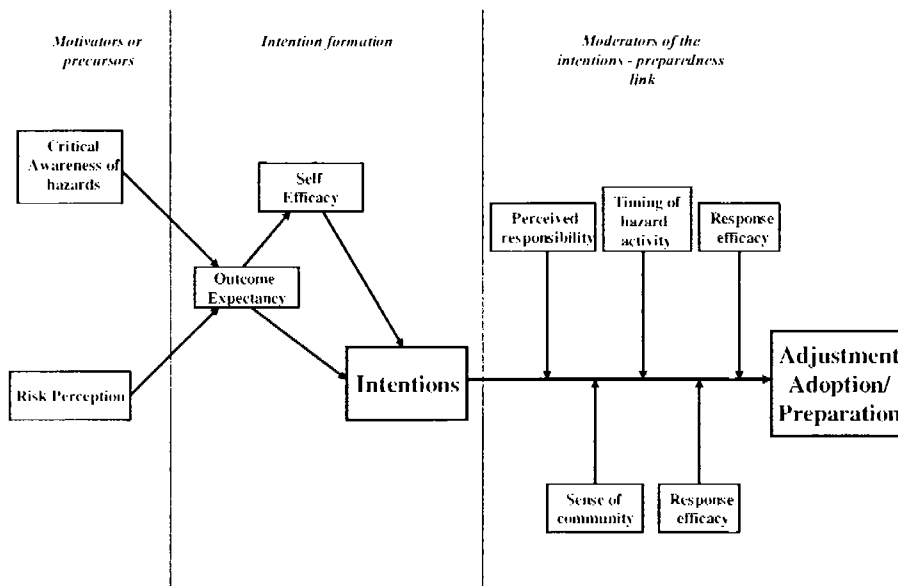
Figure 2. The social-cognitive preparation model. Adapted from Paton et al. (2003)

By identifying and quantifying the components of the process, this model can be used to assess levels of preparedness, isolate problem areas, and identify where intervention could be most profitably directed. For example, irrespective of the level of perceived risk, people are unlikely to formulate intentions to act if they perceive hazard effects as insurmountable (low outcome expectancy) or perceive themselves as lacking the competence to act (low self-efficacy).

Even when intentions are formed, they may not be acted on. The relationship between intentions and preparedness could be moderated by people's appraisal of whether they

have the time, resources, skills and social networks required for adoption (response efficacy) or if they do not feel an attachment for people and places (sense of community). The time frame within which they anticipate future tsunami activity, and whether they accept personal responsibility for safety could be similarly implicated in this context (Paton et al., 2003).

Precursor or Motivating Factors

According to the model, the preparedness process commences when people perceive a hazard posing a risk to them and when the implications of hazard activity are perceived as critical or salient.

Risk perceptions

Risk was assessed here in regard to people's perception of tsunami as posing a specific threat to their safety and their daily activities. Moderate to high levels of risk (mean = 7.31) attributed to tsunami hazards were recorded here (table 4). While not representing a major constraint on preparedness, these data indicate some scope in regard to improving risk perception.

Critical Awareness

In this sample, low to moderate levels of critical awareness (thinking and discussing tsunami) were recorded (mean = 5.09, table4). Given the more prominent influence of critical awareness on preparedness (Paton et al., 2003), the relatively low levels of thinking and talking about tsunami hazards evident here suggests that future intervention should include a component directed towards improving motivation to prepare by increasing the perceived salience of hazard issues.

Variable	Min. – Max.	Scale Mean	SD
Risk Perception	2 – 10	7.31	2.47
Critical Awareness	2 - 10	5.09	2.09
Outcome Expectancy	2 – 10	6.81	2.03
Self Efficacy	4 – 20	10.93	2.37
Intention/information search	3 – 9	4.55	1.66
Responsibility	1 – 5	4.27	1.03
Response Efficacy	5 – 25	12.36	4.49
Sense of Community	9 – 45	27.73	4.02
Preparation	0 – 11	2.66	2.05

Table 4: Means and standard deviations of preparedness process variables.

Converting Precursors to Preparatory Intentions

In the model (figure 2), the relationship between precursors and intentions is mediated by outcome expectancy and self efficacy.

Outcome expectancy

Moderate levels of outcome expectancy (belief that hazard effects can be mitigated by individual efforts) were recorded here (mean = 6.81, table 4). This suggests that there is scope for improving levels of this belief, and that this variable could act as a moderate constraint within the adjustment adoption or preparedness process.

Self efficacy

In regard to people's judgment regarding their capabilities to organize and execute the actions required to mitigate hazard effects, low-moderate levels were recorded (mean = 10.93; table4). This suggests that self-efficacy is a relatively salient constraint on the formation of preparatory intentions.

Information search/intentions

On the basis of low to moderate levels of both precursor variables, particularly critical awareness, and intention formation factors, low to moderate levels of intentions would be predicted. This prediction is supported by the data (table 4). Overall, only 13% of the sample indicated a definite intention to engage in strategies (e.g., to seek information on tsunami risk and mitigation measures) indicative of a predisposition to actively prepare. The levels of intention recorded here are consistent with the low to moderate levels of preparation described above (tables 2 & 4).

There is considerable scope for enhancing preparatory intentions. On the basis of the data presented here, increasing the perceived salience of tsunami hazards, enhancing beliefs in regard to mitigating hazard consequences, and developing competencies could contribute to the attainment of this goal.

Moderating Factors

As discussed above, the level of preparation is sensitive to the actions of several moderating variables. It is to a discussion of these factors that this paper now turns.

Perceived responsibility

Attributing responsibility from the self to others can moderate the conversion of intentions to preparedness (Ballantyne et al., 2000). A high level of personal responsibility was recorded here (table 4), indicating that it is unlikely to act as a moderator in this sample.

Response efficacy

Another moderating factor is respondents perceptions of, for example, the financial, skill, time and collaborative resources they have at their disposal (response efficacy). The data collected here (table 4) suggests that these resources were present at high levels, reducing the likelihood that this factor will act to constrain preparedness in this sample.

Sense of community

Another potential moderator is the degree to which people feel a sense of belonging to a place and to others within it. The moderate to high levels of sense of community recorded here (table 4) suggests that this factor does not contribute significantly to the low levels of preparedness observed.

The timing of the next tsunami

The time frame within which people anticipate the occurrence of the next damaging hazard event is an important moderator (Paton et al., 2003). Those who anticipated this occurring within the next 12 months were likely to convert their intentions into actual preparedness. Those anticipating a longer time frame were not. In the present sample, only 2% of the sample thought that a tsunami was likely within the next year. Consequently, this variable could make a substantial contribution to the low levels of preparedness observed here.

CONCLUSIONS

Several mechanisms were discussed her to account for the tow to moderate levels of preparedness observed. While a majority of respondents had received the hazard and preparedness information disseminated through public education campaigns, a corresponding level of preparedness did not accompany it. Explanations for this discrepancy focused on the interpretive processes that influence how hazard information is rendered meaningful in relation to the goal of preparing for hazard activity. A tendency to overestimate perceived preparedness by extrapolating from the low levels of loss and damage associated with prior hazard experiences a capability to deal with future events was supported by the data. A propensity to attribute the need for hazard information and preparedness to other members of their community rather than themselves was also evident.

An explanation for low preparedness was also discussed using a process model of preparedness that comprised three distinct, but related, stages. Acknowledging the distinction between these stages is important because they comprise different variables and require different intervention strategies to achieve change. A need to motivate residents to prepare was identified. Effective change in risk perception and critical awareness can be facilitated using public education and empowerment strategies (Paton, 2000) that focus on increasing the perceived relationship between hazard activity and issues that community members perceive as important and by encouraging risk acceptance and commitment to activity through community participation. Improved

preparedness could also accrue from enhancing community members' beliefs in the feasibility of mitigating hazard effects through personal actions (e.g., counter beliefs that hazards have totally catastrophic effects) and by enhancing beliefs in the personal competency to implement these activities. Changing these factors requires a mix of public education, social policy, training, and empowerment strategies. The third stage, converting intentions into actual behavior, could be enhanced by using public education to encourage acceptance on the unpredictability of tsunami and the dissemination of a 'sooner rather than later' message. While levels of responsibility, resource efficacy and sense of community were present at levels that supported conversion, they should not be omitted from future risk reduction initiatives. This last point is particularly important given the small sample size here.

The overall conclusion of this study is that the hazard education program to date has been successful in terms of promoting access to information about tsunami hazard amongst coastal Washington residents. Preparedness, perhaps predictably, is lagging behind this time. The findings reported here emphasized both the importance of accommodating pre-existing beliefs and interpretive processes, and the need for additional strategies to augment existing programs with initiatives that manage these beliefs and perceptions in ways that facilitate preparedness. By systematically assessing the factors that influence preparedness, the model described here can be used to identify constraints on preparedness and direct attention to areas where change is required. The data furnished by these analyses also provides baseline data against which subsequent intervention activities can be assessed.

REFERENCES

Adams, J. (1995), *Risk*, UCL Press: London.

Atwater, B.F. (1992) Geologic evidence for earthquakes during the past 2000 years along the Copalis River, southern coastal Washington: *Journal of Geophysical Research, 97*, B2, 1901-1919.

Atwater, B.F. (1997) *Coastal evidence for great earthquakes in Western Washington.* U.S. Geological Survey Professional Paper 1560.

Atwater, B.F., Nelson, A.R., Clague, J.J., Carver, G.A., Yamaguchi, D.K., Bobrowsky, P.T., Bourgeois, J., Palmer, S.P. and others (1995) Summary of coastal geologic evidence for past great earthquakes at the Cascadia subduction zone. *Earthquake Spectra, 11*, 1-18.

Ballantyne, M., Paton, D., Johnston, D., Kozuch, M., and Daly, M. (2000) *Information on volcanic and earthquake hazards: The impact on awareness and preparation.* Wellington, New Zealand, Institute of Geological & Nuclear Sciences Limited Science Report #2000/2.

Bernard, E.N. (2001) *The US National Tsunami Hazard Mitigation Program Summary. Review of the US National Tsunami Hazard Mitigation Program, Seattle, Washington, August 7, 2001.* NOAA/Pacific Marine Environmental Laboratory.

Higgins, E.T. & Bargh, J.A. (1987) Social cognition and social perception. *Annual Review of Psychology, 38,* 369-425.

Johnston, D.M., Bebbington, M., Lai, C-D, Houghton, B.F. and Paton, D. (1999) Volcanic hazard perceptions: Comparative shifts in knowledge and risk. *Disaster Prevention and Management, 8,* 118-126.

Jonientz-Trisler, C. & Mullin, J. (1999) *1997-1999 Activities of the Tsunami Mitigation Subcommittee.* A Report to the Steering Committee, National Tsunami Hazard Mitigation Program.

Lindell, M.K. & Whitney, D.J. (2000) Correlates of household seismic hazard adjustment adoption. *Risk Analysis, 20,* 13-25.

Mileti, D.S. & Fitzpatrick, C. (1993) *The Great Earthquake Experiment: Risk communication and public action.* Westview Press, Boulder, Colorado, 140 p.

Mileti, D.S. & O'Brien, P.W. (1993) Public response to aftershock warnings. *U.S. Geological Survey Professional Paper, 1553-B,* B31-B42.

Mulilis, J-P., Duval, T.S., & Lippa, R. (1990) The effects of a large, destructive local earthquake on earthquake preparedness as assessed by an earthquake preparedness scale. *Natural hazards, 3,* 357-371.

Paton, D. (2000) Emergency Planning: Integrating community development, community resilience and hazard mitigation. *Journal of the American Society of Professional Emergency Managers, 7,* 109-118.

Paton, D., Smith, L., Johnston, D., Johnston, M., & Ronan, K. (2003) *Developing a model to predict the adoption of natural hazard risk reduction and preparatory adjustments.* EQC Project Report, No. 01-479, Wellington, Earthquake Commission.

Paton, D., Smith, L.M. and Johnston, D. (2000) Volcanic hazards: Risk Perception and Preparedness. *New Zealand Journal of Psychology, 29,* 84-88.

Paton, D., Millar, M., and Johnston, D. (2001) Community Resilience to Volcanic Hazard Consequences. *Natural Hazards, 24,* 157-169.

Sjöberg, L. (2000) Factors in risk perception. *Risk Analysis, 20,* 1-11.

Smith, K. (1993) *Environmental Hazards: Assessing risk and reducing disaster.* London: Routledge.

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Walsh, J., Caruthers, C.G., Heinitz, A.C., Myers, E.P., Baptista, A.C., Erdakos, G.B., & Kamphaus, R.A. (2000) *Tsunami Hazard Map of the Southern Washington Coast: Modeled Tsunami Inundation from a Cascadia Subduction Zone Earthquake.* Washington Division of Geology and Earth Resources Geological Map GM-9.

Wilson, B.W. & Torum, A., (1972) *Runup heights of the major tsunami on North American coasts.* In National Research Council Committee on the Alaska Earthquake, 1972, The great Alaska earthquake of 1964, - Oceanography and coastal engineering, p. 3158-180.

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The Disaster Hits: Does Your Community Have Hospital Bed Surge Capacity?

LTC Daniel P. Orrico, USA

In today's world the potential for manmade or natural disaster is ever present. Emergency planners and community hospitals need to plan for the worst and be prepared to deal with mass casualties that will potentially overwhelm current bed community capacity. Surge beds are available if community based emergency planning occurs.

With the threat for terrorist initiated disasters ever increasing and the ever-present threat of natural disasters, hospital organizations need to involve themselves in community emergency planning and preparedness activities. Local, State and Federal emergency managers need to find ways to actively engage community hospitals into planning efforts and preparedness activities. The goal of this article is to address a practical approach to increasing hospital bed surge capacity during Presidential disaster declarations in which the Federal Response Plan is activated. This article will address the need for hospital organizations and emergency managers to work together, address ways that hospital organizations and community emergency managers can identify the potential for surge beds and demonstrate how the federal government can help, and finally make recommendations for future actions.

Need for a cooperative environment – *Excess hospital beds are a thing of the past!*

Since September 11, 2001, the nation is more aware of the real potential for hostile terrorist activities within the borders of the United States. Hospitals for years have been scratching to survive in the competitive Healthcare Management Environment. Staff and bed reductions have been the norm and excess capacity is a luxury of the past. Although hospitals are integral members of their community, they have not placed high emphasis on their emergency preparedness responsibilities. In some communities, the emergency planning process has not included or enfolded community hospitals. Given the increased threat for terrorist actions against the United States and the ever-present threat of natural disasters, hospitals need to engage in and become an integral part of community based emergency planning and preparedness activities.

"As cities and counties train for terrorism response, a list of universal weaknesses has begun to emerge. Already communications and health care have been identified as critical support functions in desperate need of attention" (Wade and Baltic, 2001, p. 23). In January, 2001, the Joint Commission for the Accreditation of Hospital Organizations (JCAHO), recognizing the need, increased the accreditation standards for emergency management (Steinhauer and Bauer, 2002, p. 42), currently the JCAHO recommends, but does not yet require, that hospitals consider cooperative planning with other healthcare organizations that together serve a geographical area. Although integration for

emergency planning is recommended by the JCAHO, most hospitals are not forthcoming and do the minimum to meet their accreditation requirements. Local hospitals and health care systems need to determine how they can work together within a larger framework (Advanstar, 2001, p. 779).

I believe local, county, and state emergency management agencies need to reach out to their respective health care organizations and continue to invite them to the planning table. Communities need to have integrated training and exercises that incorporate all aspects of emergency response and hospitals need to engage in these activities as well. Community emergency managers need to identify the most effective methods to mobilize and energize hospital organizations to action; so that the manmade or natural disaster is not the first time they learn that the community has an emergency management plan. According to Rubin (2001), there has been only limited coordination between governmental emergency management systems and hospitals. Additionally, the jurisdictional governments have not done a good job in reaching out to the hospital industry and selling its priorities.

In the concluding observations of a United States General Accounting Office (GAO) Testimony on Bioterrorism (2001, p. 15) it states, "we remain concerned about weakness in public health preparedness at the state and local level, a lack of hospital participation in training on terrorism and emergency response planning, ..." which is representative of the federal perception regarding the level of involvement of hospitals in community emergency preparedness activities. As the treating facility for most emergency and ill victims, hospitals are the crucial link in the community response system for all emergency preparedness planning (Kuhn, 1997). With the ever-increasing threat of bioterrorism, as the anthrax events of post September 11 demonstrated, healthcare organizations will serve as the sentinels for surveillance and essentially will be the Nation's first responders to biological terrorism. When a contagious biological outbreak occurs, manmade or natural, hospital bed surge capacity will become critical. With prior planning and integration communities can make the best of a bad situation and save lives as a result.

Planning and identifying the potential for surge beds – *How can the Feds help?*

All disasters are local and as such the local government in the disaster area is ultimately in charge during any response activities. Before the federal system can come to the assistance of communities in a disaster the situation, the Governor must declare a state of emergency and subsequently request for a presidential disaster declaration (FEMA, 1999). Once the President has signed the disaster declaration order, the Federal Response Plan (FRP) is activated. The Federal Emergency Management Agency (FEMA), as the lead federal agency for consequence management, responds to the disaster area with access to the total resources available through various federal agencies. Even with the activation of the FRP, FEMA and the other 27 supporting agencies are responding to requirements generated by the State that are no longer within the State's capabilities to provide. The FRP assigns federal lead responsibility to twelve emergency support functions (ESFs). The Department of Health and Human Services (DHHS) is assigned as

the lead federal agency for ESF 8, Health and Medical. The local jurisdictions initiate requirements that the federal government may eventually execute. By conducting integrated and comprehensive emergency planning prior to the disaster, communities will identify and better understand their areas risk and potential shortfalls.

Community and regionally based emergency planning is critical prior to the disaster. If hospitals, local health departments, and emergency managers do not plan as a team they will not be prepared for the worst when the manmade or natural disaster hits. According to Bonta (2002), "No hospital is ever fully prepared for an immediate and sustained influx of patients who may require life support systems. When the number of patients exceeds the number of available beds and staffing, decisions will have to be made as to whether alternative, off-site facilities should be opened, who will staff these facilities, and how they will be supplied." In manmade disasters, the impact of the walking worried on hospital operations cannot be overlooked. One system that hospitals and emergency managers need to be aware of is the National Disaster Medical System (NDMS).

The NDMS is a joint federal program of the DHHS, Department of Veterans Affairs (DVA), Department of Defense (DoD), and FEMA. It was initiated in 1981 to create a national network that can address health care needs in the case of catastrophic natural or technological disaster. Additionally, DOD utilizes NDMS to ensure the availability of civilian hospital services to wounded in a time of war (Friedman, 1994). The NDMS is also suitable for addressing mass casualties as a result of terrorist acts against our Nation. NDMS has three primary objectives that it is designed to fulfill (Federal Coordinating Center Guide, 1999):

✓ *To Provide supplemental health and medical assistance in domestic disasters at the request of State and local authorities.*
✓ *To evacuate patients who cannot be cared for in the disaster area to designated locations elsewhere in the nation.*
✓ *To provide hospitalization in a nationwide system to care for the victims of domestic or military contingency that exceeds the medical care of the local, state, or Federal medical system.*

The NDMS provides a pool of over 7,000 civilian health professional volunteers that are federalized to serve on deployable teams or to augment healthcare in the disaster area. It also it provides a national hospital bed surge capability with an integrated system for patient movement. Local and State emergency and health planners can request the assistance of federal representatives from the DHHS and DOD to participate in their planning and preparedness activities. The DHHS has Emergency Coordinators that serve as the executors of ESF 8 in the Disaster Field Office (DFO) that is established by FEMA in the disaster area. DHHS Emergency Coordinators have a vast repertoire of planning and preparedness experience to draw from as large communities develop their disaster plans. Also, the DOD has trained medical liaisons that serve at ESF 8 desk in the DFO with the DHHS representatives. These DOD liaisons are called Joint Regional Medical Planners and they can also assist in planning effort in large communities. These federal

planners/responders are available upon request and will educate emergency planners and health officials on the how to access federal medical resources during a disaster.

State and local communities can better prepare for the potential for hospital bed surge requirements by fully understanding their current situation and shortfalls. Hospitals are operating under constraints imposed by a national nursing and healthcare support staff shortfall. Although they may have a planned level of daily beds, most healthcare facilities are operating at less than their planned capability generally due to staffing shortfalls. Understanding this shortfall by healthcare specialty and collating the information at the Local and State Health Department level can be invaluable when the disaster hits. For instance, take a large metropolitan area that has 30 hospitals with a total of planned 3,000 beds. That same community may not be actually operating all 3,000 beds due to staffing shortfalls. For the sake of discussion let us say that they can only staff 2,500 of those beds on any given day due to the current healthcare situation in the community. If the State Health Department had a consolidated list of staffing shortfall by facility and specialty, then upon Presidential Disaster Declaration, the State Health Department could initiate a request for federal assistance through the State Coordinating Officer.

This request would go to the Federal Coordinating Officer (FCO) in the DFO and would get tasked to ESF 8, Health and Medical for validation and execution. Once ESF 8 validates the requirement, a formal mission assignment could result in DHHS, DOD, and the VA providing staffing to the 30 community hospitals to bring them up to their full operational capability. In this situation, DHHS, DOD, and the VA could task within their healthcare systems to pull the appropriate staff to meet the needs of this critical shortfall. Once the mission assignment has been approved by the FCO, staffing shortfalls could start to arrive and get integrated into local hospitals within 24-48 hours. Although this system will not provide immediate relief that is within the first 24 hours, it does provide great potential for short-term relief. Additional beds requirements could result in the deployment of a DOD medical facility into the disaster area or activation of the NDMS system and evacuation of casualties out of the disaster area.

Emergency Managers and healthcare official need to also plan for the potential that not all of its facilities will survive the disaster. By clearly understanding the day-to-day situation regarding the community healthcare facility-staffing situation, staffing resources made available through the destruction of hospitals can be reallocated to other facilities in the community to augment them and bring them up to their full operational capability. If this occurs, the competitive nature of the healthcare environment needs to be set aside and a holistic approach must ensue which will assist the community in maximizing its assets and saving lives.

Many more creative approaches are available to address disaster healthcare issues. DHHS Emergency Coordinators and DOD Joint Regional Medical planners are assets that will assist large communities and State health officials upon request with their planning and preparedness process. Emergency managers, healthcare officials at the state and local level, and federal planners working together can plan for potential manmade or

natural disasters. With a team oriented approach responses to the worst situations can give the affected communities and States options for making the best out a bad situation.

Recommendations for future actions – *Where do we go from here?*

"While healthcare facilities are an essential component of the emergency response system, at present they are poorly prepared. (Macintyre et al, 2000). In today's environment, healthcare facilities can no longer be satisfied with merely meeting the accreditation standards placed upon them by JCAHO. Listed below are some key recommendations for success and future actions:

> *Develop community/regionally based disaster plans that integrate hospitals, emergency managers, Local, State and Federal health officials, and emergency responders.*

> *Access federal grant programs like the Bioterrorism Hospital Preparedness Program through the Health Resources and Services Administration, DHHS, (2000).*

> *Develop regional/community cooperative agreements: pooling supply and personnel resources and ensuring common staff training (Rubin, 2001).*

> *Provide federal tax incentives to healthcare facilities for their emergency planning and preparedness activities.*

> *Make Bioterrorism and emerging infectious disease planning a contingency for accreditation of healthcare facilities upon more stringent JCAHO standards (Bartlett, 2001).*

> *Develop community wide horizontal and vertical relationships between organizations, governmental and private, that will be called upon to work together in a mass casualty incident. Hospital participation in these functions is essential (American Hospital Association (AHA), 2000, p. 20).*

> *Communities and regions need to create and/or link existing data reporting systems to provide a community-wide assessment of health needs, beds, and resources (AHA, 2000, p. 21).*

> *Community-wide mass casualty drills should supplement the individual hospital and small casualty drills generally in use today (AHA, 2000, p. 22). This will help communities identify their potential shortfalls where they may require federal assistance.*

> *Ensure solid linkages exist between healthcare facilities and the public health system. This is especially critical for response to biological or chemical disasters.*

> *Continue to resource federal programs like the Metropolitan Medical Response System (MMRS), that funds the nation's largest cities to develop integrated systems for response. Deliverable #8 requires a component MMRS plan for local hospital and healthcare systems (DHHS, 2001, p. 12).*

> *A multidisciplinary committee should develop a comprehensive communications plan (Northern Virginia Emergency Response Coalition, 2002).*

The list of recommendations could go on and on. The final item that I would recommend and implore you to consider is that each community/region must move forward and

develop multidisciplinary planning groups to address their own unique collective emergency planning and preparedness requirements.

In Summery – *The future is now!*

The need for integration of hospitals and emergency planners in community/regional disaster planning efforts is real. September 11, 2001, and major natural disasters like the Northridge earthquake demonstrate that the potential for manmade or natural disasters will happen. It is not a matter of if, but when. Our communities are no longer safe. Through good planning, States can access federal capabilities more efficiently in times of disaster through systems like the NDMS and the support of ESF 8 in the Disaster Field Office under the provisions of the FRP. Many recommendations exist, but unless action is taken, beds will not be available when needed, nor will the preplanned workarounds. If we wait to develop our best course of action when human lives are at risk, then surely many will die from our combined lack of readiness.

Disclaimers
The opinions expressed in this article are not necessarily those of the United States Army or the Department of Defense.

Since March of 2003, FEMA and the Office of Emergency Response (which includes the NDMS system and the regional emergency coordinators), along with major parts of other federal agencies were moved to the newly formed Department of Homeland Security as part of a major governmental reorganization.

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References

Advanstar Communications, Inc. (2001), Federal protocols plus local follow-through is key to hospitals' terrorism readiness, experts say. Formulary, v36i11, p. 778.

American Hospital Association (2000, August). Hospital preparedness for mass casualties.

Bartlett, J. G. (2001). Mobilizing professional communities. Public Health Report v116 i2. Washington DC: U.S. Government Printing Office.

Bonta, D. M. (2002), California hospital bioterrorism response planning guide, p. 9. California Department of Health.

Department and Health and Human Services. (2001). Metropolitan medical response system (MMRS), 2001 MMRS contract deliverable evaluation instrument. Washington DC: U.S. Government Printing Office

Federal Emergency Management Agency (1999, April). Federal response plan. FEMA 9230.1-PL. Washington DC: U.S. Government Printing Office.

Friedman, E. (1994). Coping with calamity: how well does health care disaster planning work? The Journal of the Medical Association v272 n23 p1875(5).
U.S. Government Accounting Office (2001, October). Bioterrorism: public health and medical preparedness. Testimony: Before the Subcommittee on Public Health, Committee on Health, Education, Labor, and Pensions, United States Senate. GAO-02-141T, p. 15. Washington DC: U.S. Government Printing Office.

NDMS Directorate Staff (1999, August). Federal coordinating center guide, p. 6. Washington DC: U.S. Government Printing Office.

Health Resources Services Administration (2002, February). Bioterrorism hospital preparedness program, cooperative agreement guidance. Washington DC: U.S. Government Printing Office.

Kuhn, J. M. (1997). A study of factors associated with emergency department preparedness for employee safety during treatment of hazardous material patients: Implications for hospital emergency planning (Hazmat, Hawaii). (Doctoral Dissertation, University of Hawaii, 1997). Dissertation Abstract International, 58, 2341.

Macintyre, A. G., Christopher, G. W., Eitzen, E., Gum, R., Weir, S., DeAtley, C., Tonat, K., and Barbera, J. A. (2000). Weapons of mass destruction events with contaminated casualties. Effective planning for health care facilities. JAMA v283 n2, p. 242.

Northern Virginia Emergency Response Coalition (2002, January). Strategic Objectives for 2002. Northern Virginia.

Rubin, J. (2001). Institutional networks: regional response to disaster. Public Health Reports, v116 i2. Washington DC: U.S. Government Printing Office.

Steinhauer, R. and Bauer, J. (2002). The emergency management plan. (A readied response). RN v65 i6 p. 40(6).

Wade, B. and Baltic, S. (2002). Preparing for the worst: how are local governments planning and training to counter terrorism? American City and Country v116 i17 p. 20(4).

Epistemological Problems in Emergency Management: Theoretical Dilemmas and Implications

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and

Melissa Marshall

In spite of the rapidly growing body of disaster literature, one would be hard pressed to find frequent mention of the epistemological problems confronting emergency management theory. Epistemology - or the study of how and why knowledge is acquired - involves a process of questioning how scholars generate findings for each other, the students they teach and the practitioners that rely on their recommendations (see Campbell and Hunter 2000). Put differently, epistemology uncovers the strengths and weaknesses of values, assumptions and methods relied upon for theory development. The term "epistemological problems," therefore, refers to the challenges facing scholarship, and the dilemmas inherent in the approaches taken for knowledge acquisition.

The necessity of considering this subject has been reinforced by our attendance at numerous conferences, including the most recent Higher Education Workshop at FEMA's Emergency Management Institute. It seems as if the discipline of emergency management (assuming we are justified in labeling it as such) is experiencing the same turmoil facing the profession of emergency management (assuming this status is now warranted). In both cases, the nature, purposes and boundaries are in question. In addition, the lack of a coherent theory about the most appropriate approach to disasters is hindering effective policy formation and implementation. This being the case, it is woefully evident that critical reflection is in order. For this reason, we will attempt to provide one perspective on the dilemmas facing both scholars and practitioners in the hopes of findings ways to resolve them. Nevertheless, we recognize that this paper will likely promote further dialog on the matter, rather than ending the debate about this important topic.

Preliminary Remarks

Although emergency management is undoubtedly in an epistemological conundrum, it might be wise to consider two important points. First, the current state of theory is not solely or necessarily a problem. The difficulties we face may in all actuality be a blessing in disguise for disaster scholarship. New perspectives, and more holistic approaches, often arise from conflicts within academic concepts or from competition across theoretical paradigms (see Lapid 1989).

Second, it is important to recognize that emergency management is not the only area of scholarship struggling with epistemological problems. For instance, international

relations is one of many fields that is being forced to deal with similar challenges regarding empirical content, hypothetical explanations and ideological premises (see Lapid 1998, 239). As this field of study emerged after World War II, debate ensued about which approach (realist or idealist) better explains political phenomena at the global level (see Angell 1939; Claude 1971; Niebuhr, 1932; Morganthau 1948). Although the discipline gave priority to the issue of war versus peace (which was a priority that was never fully accepted), a new discussion emerged regarding research methodology (Kaplan 1966). Some scholars accepted a rigorous strategy based on mathematical models and statistical analysis (Russett 1967; Singer 1969), while others asserted that a "softer science" based on case studies, history, interpretations and reasoning was also beneficial (Bull 1966; Young 1969). In spite of (or as a result of) the fact that this debate also failed to generate consensus, a third debate began in the field. Scholars initiated a discussion about the very development of knowledge itself (Lapid 1989; Neufield 1995; Smith, Booth and Zalewski 1996). A good case in point was a study of conflict resolution in the Middle East. A group of psychologists and other scholars declared that "Maharishi Technology" has had a positive impact on the reduction of international conflict (Orme-Johnson et. al. 1988). Their argument was that transcendental meditation, a form of collective consciousness, reduces the occurrence of war. When this research was published, numerous scholars questioned the relevance of this unusual subject matter while others attacked the methods that produced the researchers findings (Duval 1988; Schrodt 1990). In response, the scholars countered that the topic deserves scientific exploration and/or that the investigative strategy was intellectually sound (Orme-Johnson et. al. 1990). This is only one of many examples of reflexivity that could be provided from various disciplines to date. Emergency management is definitely not the only area of study to confront difficult theoretical challenges.

Ten Epistemological Problems

As we see it, there are several major epistemological problems in emergency management theory. Of the many that could be mentioned here, we will discuss ten:

1. What is a disaster?
2. What is emergency management?
3. What hazards should we focus on?
4. Should we continue to give preference to the concept of hazards?
5. What variables should be explored in academic research?
6. What actors should be incorporated into academic studies?
7. What phases should we give priority to?
8. What disciplines should contribute to emergency management?
9. What paradigms should guide our field?
10. What is the proper balance for knowledge generation?

The most fundamental epistemological problem in emergency management deals with the nature of disaster. Quarantelli and others (1998) have devoted an entire volume to this topic, and have eloquently and critically reviewed the different perspectives on this

matter. Suffice it to say, views about disasters are diverse and disagreement is profound. This joint effort has not resulted in the generation of consensus, and other volume is being developed at this time. Nevertheless, there has been a definite historical evolution of the concept (McEntire 2001, 189-190). Views of disaster have shifted from "acts of God" to "natural hazards" and/or "socially disruptive events" (Cannon 1994; Fritz 1961). Currently, many scholars assert that disasters are socially constructed events (Bolin and Stanford 1999). The argument here is that our values, attitudes and practices result in the occurrence of disaster. These and other views are similar in that they each examine the causes and consequences of disaster. Simplifying the argument considerably, it might be stated that some definitions regard disasters to be physical phenomena while others see them as social phenomena.

This discussion about disasters is problematic for a number of reasons. Natural disasters have more than physical causes and consequences (Blaikie et. al. 1994; Kreps and Drabek 1996). For instance, the building of homes on beachfront property undoubtedly raises the potential for damage in a hurricane. Also, the disruptive impact of a natural hazard upon human activity can be extremely severe. There are other types of disasters (e.g., technological or civil) that result predominantly from human mistakes and behavior. Three Mile Island and 9/11 are a few of the many examples that could be given. Thus, we cannot simply state that disasters are physical phenomena only. This would overlook the impact of human decisions, and exclude the influence of the built environment and modern technology. At the same time, it would be incorrect to assume that a disaster is only a social phenomenon. Without a natural hazard agent, we could not have a natural disaster. Consequently, we must necessarily come to the conclusion that disasters are both physical and natural phenomena - although some may have more characteristics on one end of the spectrum than the other.

A second epistemological hurdle hinges on the definition of emergency management, which is analogous to the conceptual problem of disaster. The term emergency management has at least two significant defects. The very name of the field we study is a misnomer. Emergency managers are not really concerned about emergencies: they are instead interested in larger events that have community-wide impact (Drabek and Hoetmer 1991). We should state, of course, that there are some similarities between emergencies and disasters. For instance, a small house fire may disrupt the routines of a family like a significant calamity or catastrophe would. Furthermore, the emergency manager does or should have involvement in all areas relating to public safety (e.g., he or she may become involved in a heat wave which typically produces more deaths each year in the United States than many other disaster events combined). Nevertheless, disasters are qualitatively distinct from accidents and emergencies. Consequently, first responders are required for small incidents, while their efforts are supplemented and superceded by those of emergency managers in larger disasters. Therefore, first responders are not emergency managers, although they are certainly important participants in emergency management. Emergency managers, on the other hand, are really disaster managers (and are not generally first responders).

The other problem with the term emergency management is that it is an oxymoron. It may unintentionally suggest that we can control or always effectively deal with extreme

events. While it is true that we are able to prevent some disasters or reduce their adverse impacts, we are less likely to manage our responses to these events in a totally effective manner (Quarantelli 1997). Nevertheless, our ability to manage disasters is enhanced through mitigation and preparedness measures such as improved engineering, planning, training and exercises (Drabek and Hoetmer 1991). Thus we must recognize both our ability and futility in dealing with disasters. Managing disasters may be effective or defective, or will most likely witness a complex combination of the two extremes.

A third major epistemological problem has plagued scholars is what hazards we should concentrate on. When emergency management was initially conceived, it gave preference to civil defense issues, mainly the nuclear hazard. Since this time, students have shifted attention to technological and natural hazards (Rubin and Tanali 2001). Now, of course, emergency management has come full circle by focusing on terrorism (although modern terrorism is certainly more complex than the nuclear threat of the Cold War) (Alexander 2002). Obviously, the drawback of focusing on any particular hazard is that we tend to ignore the others that will almost certainly affect us. Also by taking an all hazards approach we are less likely to be surprised by unusual events such as the World Trade Center collapse or the space shuttle breakup up over Texas. What is more, lessons from one disaster often transfer across hazards, and some functions are applicable to all types of hazards. Regardless, some scholars will argue that we should focus our efforts on those disasters that are more frequent. This is a logical argument as we could save resources by concentrating on those events that are most common. The disadvantage associated with this approach is that we may also be impacted by low probability, but high consequence events. For instance, it would be a grave mistake to avoid studies on bio-terrorism since many thousands, hundreds of thousands or millions could die if this type of terrorist attack occurred (Fischer 1999). In contrast, giving preference to unlikely but consequential events would ignore the high probabilities of floods, tornadoes and earthquakes. Hence, the inclusion of all types of hazards is needed to avert the negative results of giving preference to any single hazard or set of hazards.

The prevalence of discussing hazards instead of vulnerability is another epistemological problem in emergency management theory (McEntire 2001). A sizable portion of past literature on disasters has concentrated on the characteristics of hazards (e.g. magnitude, frequency, duration, areal extent, speed of onset, spatial dispersion and temporal spacing) (Burton, Kates and White 1993). Today, scholars also use the concept of hazard frequently in their research (Mileti 1999). Although no one would dispute the presence of "triggers" that initiate disaster, scholars ironically fail to recognize that we are absorbed on that which we have no control over. Humans cannot stop floods and earthquakes from occurring. However, people are capable of limiting risk to extreme events by addressing their vulnerability (McEntire 2001). For example, land use planning and preparedness measures (i.e., vulnerability reduction measures) will limit the impact of natural hazards. Thus, it is our belief that scholarship would be better served by concentrating on vulnerability (which still has relation to hazards), instead of focusing on hazards (which do not necessarily capture the concept of vulnerability).

Accepting this shift from hazards to vulnerability does not limit our discussion of disaster phenomena. In fact, this reprioritization will actually increase the number of variables that require academic investigation. For example, scholars must spend time investigating structural mitigation, community education, emergency communications, triage, convergent behavior, the role of insurance, sustainable disaster recovery, etc. We must come to the conclusion that there is much more to disasters than natural, technological or civil hazards.

This presents yet another epistemological problem for emergency management theory: which variables should be given academic priority? Although structural failure, warning, evacuation and sheltering are common issues in many disasters, we must not forget that there are other issues related to emergency management (e.g., special populations, politics, record keeping, mass fatality management, critical incident stress, etc.). Accordingly, there may be much intellectual merit in exploring important or neglected topics. However, we must not look for a "silver bullet" to solve the disaster problem. Although no one would deny the fact that effective land use planning could do much to prevent the frequency and severity of most natural disasters, we should not also make the mistake of assuming that there are hazard-free areas, and incorrectly believe that non-structural mitigation will resolve all technological or civil disasters. These facts reiterate the importance of holistic approaches to disaster, or at least the need to spell out the advantages and disadvantages of examining one variable over another.

The organizational boundaries of emergency management also proves to be an epistemological problem. Emergency management is by its very nature a multi-organizational activity (McEntire 2002a). It involves individuals and organizations from the public, private and non-profit sectors. Actors include public servants and their associated departments at the local, state and federal levels. Emergency management functions likewise require the contributions of various businesses, community based organizations, churches, the Red Cross and emergent groups. But the activities of these entities may be haphazard or even counter productive unless they are integrated in a systematic fashion. Therefore, emergency managers are vital for coordination. But the emergency manager alone will not be successful unless he or she is surrounded by, and relies upon, the expertise and resources of others. Hence, this epistemological problem can be overcome by including all of the actors involved in disasters, but acknowledging the central role of the emergency manager.

The four phases of emergency management present an additional epistemological problem. David Neal (1997) has already explored the complexities of these phases in terms of overlap and fluidity. This lack of clear boundaries within the timeline of disaster is now widely accepted, so this subject will not be treated further here. What is necessary and possibly even disturbing, however, is to see priority shifts among these phases. Previously, scholars spent a great deal of attention on preparedness, response and recovery issues (McEntire 2002b). Today, it is recognized that these phases are very reactive. Mitigation and recovery (as it relates to mitigation) are becoming the focus of academic research (Burby 1998; Britton 1999; Godschalk et. al. 1999; Geis 2000). It is indisputable that we need more research on disaster prevention and reduction since we

know very little about mitigation as compared to the other phases (Mileti 1999). Unfortunately, focusing on proactive measures alone implies that all disasters can be prevented. The reality is that disasters have always occurred and they will continue to do so. We simply do not have sufficient knowledge, will and power to fully prevent them. Nevertheless, as Quarantelli has stated (1993, 25), "the fact that not everything can be done does not mean that something cannot be done." Our own view is that scholarship must become more proactive now and in the future, but preparedness, response and recovery will always be needed and must not be overlooked.

The location of emergency management in academia, and its relation to various disciplines also poses epistemological problems (Neal 2000). Historically, most scholars of emergency management have graduated from geography and sociology. Indeed, the literature from these fields is rich and has dramatically shaped emergency management. The former helps us to understand the causes of extreme environmental events while the latter enables us to comprehend the patterns of human responses to disasters. That being said, one of the problems of maintaining emergency management in these disciplines alone is that they may overlook the importance of leadership, management skills, intergovernmental relations and other topics. This is not to deny the value or outstanding record of contributions by sociologists and geographers, but it is to recognize that disciplines such as public administration may also play a role in the production and application of research findings pertaining to the public sector.

Regardless, emergency management education programs and research projects could be placed in many disciplines including anthropology, environmental studies, political science, psychology, engineering, epidemiology, etc. And each discipline undoubtedly makes important contributions to emergency management (McEntire 2003). For example, anthropology helps us to understand the impact of culture on adaptations to hazards. Environmental studies underscore the need to consider the dangers of environmental degradation. Political science enables one to identify the political barriers confronting emergency managers. Research in psychology reveals how people process risk and cope emotionally with disaster. Engineering identifies safer ways to construct buildings and infrastructure. And, epidemiology uncovers the medical component of disasters, including the cause(s) of injury and treatment of diseases. Unique contributions may also be achieved in computer science, criminal justice, law and meteorology. In spite of this intellectual cornucopia, universities and funding are not always supportive of inter or multi-disciplinary work. In addition, scholars are hesitant to accept the concerns and methods of their counterparts in other fields. Conceptual language or other organizational barriers also hinder cross-disciplinary knowledge development. It will be necessary to at least attempt to cooperate if these chasms can be bridged however.

The proliferation of diverse disaster paradigms presents additional epistemological problems (McEntire 2002b). For a number of decades, the guiding paradigm has been comprehensive emergency management. It focused on all hazards, phases and actors pertaining to disasters. However, it was reactive and ignored the social, cultural, political and economic issues of disasters. Scholars have therefore explored concepts such as resistance, resilience and sustainable development. Homeland security has also come to

the forefront of the literature since 9/11. But these concepts also have their own epistemological problems. Resistance does not relate well to response issues and may be limited to engineering (Geis 2000). Resilience, for its part, is somewhat reactive (although many scholars use it to imply prevention or mitigation), and it generally captures social, political, economic and cultural issues only (Buckle, Mars and Smale 2000; Burby et. al. 2000). Sustainable development/sustainable hazards mitigation helps us to understand the importance of land use planning, but it has trouble relating to disaster preparedness and response functions (Burby 1998; Mileti 1999; Berke 1995). Finally, homeland security is limited to the civil hazard of terrorism and takes a step back from the proactive approaches being promoted today. Therefore, each of these new paradigms must be supplemented with the strengths of others in order to avoid the pitfalls of any singular perspective.

The last epistemological problem to be discussed here is connected with the process of how academia derives knowledge for emergency managers. Many scholars assert the supremacy of theory over practical experience. Certainly, no serious scholar will question the value of academic concepts and empirical research. But we should be very careful to avoid an attitude of omniscience. Do we really believe we have all of the answers and the best solutions? If so, why do we spend time interviewing and interacting with practitioners? We also need to ensure that our theories are not limited to the "ivory tower." Can our theoretical concepts survive and be applied in the real world? Similarly, we must teach sound theory, but also help students develop skills and abilities for the careers that await them. Do we not want our students to make positive contributions when they graduate? Hence, book learning is vital and necessary for the future generation of emergency managers, but education must also provide at least some practical application of that knowledge.

Discussion and Conclusion

By now it should be apparent that there are serious epistemological problems facing those who study emergency management. These challenges range from disagreement about theoretical concepts and faulty assumptions about the human role in disasters to disputes about the inclusion of various disciplines and the relative merit of competing paradigms. It should also be evident from this discussion that common ground needs to be found to integrate academic findings. The scope and complexity of emergency management is only now being recognized. Never before has there been so great a need to see the big picture of disasters.

For these reasons, it our opinion that many of the epistemological problems identified in this paper may be overcome by avoiding extreme perspectives in emergency management theory. In addition, it is our view that the field can obtain a higher degree of synthesis by focusing on the concept of vulnerability (McEntire 2002b). Vulnerability is an integral component in the concept of disaster and the field of emergency management. It is related to all types of hazards and most disaster variables. Each actor has a bearing on the extent of human vulnerability to deadly, destructive and disruptive events. All disciplines also recognize the impact of vulnerability on the occurrence and severity of

disaster. Finally, scholars and practitioners may find increased unity by agreeing on vulnerability as the common problem to be addressed regarding disaster phenomena.

With this in mind, the concept of vulnerability seems to surmount many of the epistemological problems mentioned here. Consequently, it might be necessary to change the name of the field we study from emergency management to disaster vulnerability management (McEntire 2002b). This implies that we endeavor to reduce liabilities such as risk and susceptibility. It also implies that we strive to raise capabilities such as resistance and resilience.

While we acknowledge that our proposed name change is unlikely to be accepted because of tradition and the widespread recognition of the term emergency management, we hope this paper has at least caused others to reconsider their thinking about disasters. At a minimum, we encourage scholars to continue this discussion so that the epistemological problems can be taken into account as we strive to improve the practice of emergency management.

References

Alexander, David. 2002. From Civil Defense to Civil Protection – and Back Again." *Disaster Prevention and Management* 11 (3): 209-213.

Angell, Norman. 1939. *The Great Illusion – Now.* London: Penguin Books.

Berke, Phillip R. 1995. "Natural Hazard Reduction and Sustainable Development: A Global Reassessment." *Working Paper no. S95-02.* Center for Urban and Regional Studies.

Blaikie, Piers, Terry Cannon, Ian Davis and Ben Wisner. 1994. *At Risk: Natural Hazards, People's Vulnerability and Disasters.* New York: Routledge.

Bolin, Robert and Lois Stanford. 1999. "Constructing Vulnerability in the First World: The Northridge Earthquake in Southern California." In A. Oliver-Smith and S.M. Hoffman, eds., *The Angry Earth: Disaster in Anthropological Perspective*, New York: Routledge.

Buckle, Philip, Graham Mars, and Syd Smale. 2000. "New Approaches to Assessing Vulnerability and Resilience." *Australian Journal of Emergency Management* 15 (2): 8-14.

Bull, Hedley. 1966. "International Theory: The Case for the Classical Approach." *World Politics* 18 (3): 361-377.

Burby, Raymond, Robert E. Deyle, David R. Codschalk, Rober B. Olshansky. 2000. "Creating Hazard Resilient Communities Through Land-Use Planning." *Natural Hazards Review* 1 (2): 99-106.

Burby, Raymond J. 1998. *Cooperating With Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.* Washington, D.C.: Joseph Henry Press.

Burton, Ian, Robert W. Kates and Gilbert F. White. 1993. *The Environment as Hazard.* New York: Gilford Press.

Campbell, Richmond and Bruce Hunter. 2000. *Moral Epistemology Naturalized.* Alberta: University of Calgary Press.

Cannon, Terry. 1993. "A Hazard Need not a Disaster Make: Vulnerability and the Causes of 'Natural' Disasters," in P.A. Merriman and C.W.A. Browitt, eds., *Natural Disasters: Protecting Vulnerable Communities.* London: Thomas Telford.

Claude, Inis L. Jr. 1971. *Swords into Ploughshares.* New York: Random House.

Drabek, Thomas E. and Gerard J. Hoetmer. 1991. *Emergency Management: Principles and Practice for Local Government. Washington D.C.: ICMA.*

Duval, Robert. 1988. "TM or Not TM? A Comment on 'International Peace Project in the Middle East.'" *Journal of Conflict Resolution* 32 (4): 813-817.

Fischer, Henry W. III. 1999. "Dimensions of Biological Terrorism: To What Must We Mitigate and Respond." *Disaster Prevention and Management* 8 (1): 27-32.

Fritz, Charles E. 1961. "Disasters." In Robert K. Merton and Robert A. Nisbet, eds., *Contemporary Social Problems.* New York: Harcourt.

Geis, Don. 2000. "By Design: The Disaster Resistant and Quality-of-Life Community." *Natural Hazards Review* 1 (3): 151-60.

Godschalk, David R., Timothy Beatley, Philip Berke, David J. Brower and Edwar J. Kaiser. 1999. *Natural Hazard Mitigation: Recasting Disaster Policy and Planning.* Washington, D.C.: Island Press.

Kaplan, Morton. 1969. "The New Great Debate." In Klaus Knorr and James N. Rosenau, eds., *Contending Approaches to International Politics.* Princeton: Princeton University Press.

Kreps, Gary A. and Thomas E. Drabek. 1996. "Disasters as Nonroutine Social Problems." *International Journal of Mass Emergencies and Disasters* 14 (2): 129-153.

Lapid, Yosef. 1989. "The Third Debate: On the Prospects of International Theory in a Post-Positivist Era." *International Studies Quarterly* 33: 235-254.

McEntire, David A. 2003. "Searching for a Holistic Paradigm and Policy Guide: A Proposal for the Future of Emergency Management." *International Journal of Emergency Management* 1 (3): 298-308.

McEntire, David A. 2002a. "Coordinating Multi-organizational Responses to Disaster: Lessons from the March 28, 2000, Tornado." *Disaster Prevention and Management* 11 (5): 369-379.

McEntire, David A. 2002b. "A Comparison of Disaster Paradigms: The Search for a Holistic Policy Guide." *Public Administration Review* 62 (3): 267-281.

McEntire, David A. 2001. "Triggering Agents, Vulnerabilities and Disaster Reduction: Towards a Holistic Paradigm." *Disaster Prevention and Management.* 10 (3): 189-196.

Mileti, Dennis S. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States.* Washington, D.C.: Joseph Henry Press.

Morganthau, Hans J. 1948. *Politics Among Nations: The Struggle for Power and Peace.* New York: McGraw-Hill.

Neal, David M. 2000. "Developing Degree Programs in Disaster Management: Some Reflections and Observations." *International Journal of Mass Emergencies and Disasters* 18 (3): 417-437.

Neal, David M. 1997. "Reconsidering the Phases of Disaster." *International Journal of Mass Emergencies and Disasters* 15 (2): 139-264.

Niebuhr, Reinhold. 1932. *Moral Man and Immoral Society.* New York: Scribners.

Neufield, Marc. 1995. *The Restructuring of International Relations Theory.* New York: Cambridge University Press.

Orme-Johnson, David, Charles Alexander, and John Davies. 1990. "The Effects of the Maharishi Technology of the Unified Field: Reply to a Methodological Critique." *Journal of Conflict Resolution* 34 (4): 756-768.

Orme-Johnson, David, Charles Alexander, John Davies, Howard Chandler and Wallace Larimore. 1988. "International Peace Project: The Effects of Maharishi Technology of the Unified Field." *Journal of Conflict Resolution* 32 (4): 776-812.

Quarantelli, E.L. 1998. *What is a Disaster? Perspectives on the Question.* New York: Routledge.

Quarantelli, E.L. 1997. "Ten Criteria for Evaluating the Management of Community Disasters." *Disasters* 21 (1): 39-56.

Quarantelli, E.L. 1993. "The Environmental Disasters of the Future Will Be More and Worse but the Prospect is Not Hopeless." *Disaster Prevention and Management* 2 (1): 11-25.

Rubin, Claire BN. and Irmak R. Tenali. 2001. *Disaster Time Line: Selected Milestone Events and U.S. Outcomes.* Arlington: Claire Rubin and Associates.

Russett, Bruce. 1967. *International Regions in the International System.* Chicago: Rand McNally.

Schrodt, Philip. 1990. "A Methodological Critique of a Test of the Effects of Maharishi Technology of the Unified Field." *Journal of Conflict Resolution* 34 (4): 745-755.

Singer, J. David. 1969. "The Incomplete Theorists: Insight Without Evidence." In Klaus Knorr and James N. Rosenau, eds., *Contending Approaches to International Politics.* Princeton: Princeton University Press.

Smith, Steve, Ken Booth and Marysia Zalewski. 1996. *International Theory: Positivism and Beyond.* New York: Cambridge University Press.

Young, Oran. 1969. "Professor Russett: Industrious Tailor to Naked Emperor." *World Politics* 21 (3): 486-511.

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Comprehensive Emergency Management
A Comparative Analysis of Aviation Industry Programs and Realities

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A variety of research is available within the public sector related to the four phases of emergency management. Much of this research results in improved planning and response at the local, state and federal level. However, little research is available within the private sector. This paper analyzes current public sector research to determine if the findings relate to private sector emergency management practices, in particular the aviation industry, and can be used to improve planning and response.

Preparedness

James M. Dahlhamer and Melvin J. D'Souza (1997) explored the determinants of planning and preparedness of the private sector in Memphis/Shelby County, Tennessee and Des Moines/Polk County, Iowa. They found that business disaster preparedness varied depending on size of company, whether the company property was owned or leased, and previous disaster experience. The study found very low levels of preparedness overall. Dahlhamer et al. (1997) suggest several initiatives to increase preparedness; including awareness, education, and intervention by government in the form of mandates or incentives.

The aviation industry is a good example of how government mandates improved industry preparedness. The Aviation Disaster Family Assistance Act of 1996 and Foreign Air Carrier Family Assistance Act of 1997 mandate that U.S. and Foreign commercial air carriers who fly to the U.S. develop a plan for responding to the needs of passengers and families following an aviation accident in the U.S. Prior to this mandate, most airlines were unprepared, planning initiatives were insufficient, and employees were ill equipped to deal with the aftermath of an accident. Typically, except for large commercial carriers, most airlines lacked emergency plans. Response roles were undefined and employees were untrained, which resulted in personnel on duty at the time of an accident being called upon to respond at the best of their ability. Today, all U.S. airlines and foreign carriers servicing the U.S. are required to file a plan with the Department of Transportation and the National Transportation Safety Board (NTSB). Many airlines have internal, integrated emergency response plans and programs, train staff in accordance with requirements of the law, and conduct regular exercises to test operations.

Similar to what Dahlhamer et al. (1997) found in their study, these preparedness initiatives vary throughout the aviation industry, depending on size of the airline and previous disaster experience. In some cases, regional, charter and international airlines with few personnel in the U.S., are less prepared than the major U.S. carriers. This is

traditionally due to a lack of personnel and financial resources. Many of these smaller airlines must rely on external vendors and resources to support their preparedness and response initiatives in order to ensure compliance with the legislation. Airlines experiencing a major accident in the past are, in most cases, more likely to have a strong preparedness program and disaster plan. Alaska Airlines Flight 261 crashed in January of 2000 off the coast of California. Alaska Airlines had an emergency response plan in place at the time of the accident and had identified and trained emergency response teams. Today, Alaska Airlines' preparedness programs continue to grow and strengthen and emergency plans and procedures are revised based on lessons learned and industry developments.

Other private sector companies develop similar emergency response programs to support customers and families, not based on legislative requirements, but awareness and corporate beliefs and missions. One such company, Marriott International, implements an emergency phone center to support hotel guests, families of guests, and employees following an emergency. The phone center provides emotional support, logistics and emergency related information.

Little research exists on private sector emergency planning, however, in reviewing many private sector emergency plans, it is evident that the findings related to community emergency planning can also be applied to the private sector. In his article *Community Emergency Planning,* Dynes (1994) examines several themes that dominate plans based on the command and control model. In conducting organizational assessments and reviewing emergency response plans for airlines and other private sector companies, the author has seen the following themes suggested by Dynes (1994):

- A great deal of time and effort is given in the planning document to specifying authority relationships.
- Plans usually assume that authority is uni-dimensional in emergencies, even while recognizing that pre-emergency authority is multidimensional.
- There is a tendency to over-plan and over-detail.
- There is emphasis on creating special emergency-specific organizational structures and to detail lines of communication, reporting and authority patterns.
- It is believed that the most important form of communication is "down" the authority structure.
- Victims are passive and cannot "help" themselves.

"Emergency planning is based on assumptions about the social characteristics of the emergency period and on the nature and direction of the appropriate response to the characteristics of that period. The dominant model is based, then, on several interrelated assumptions. First, that the emergency period is characterized by a sharp distinction from the pre-emergency period. While the pre-emergency period can be characterized by some notion of 'normalcy', the emergency period is marked off by manifestations of social chaos. Since the 'problem' is found in the 'weakness' of individuals and of social structure, emergency planning should be directed to establishing

a 'command' over the chaos and to 'regain control' over the disorganization of individuals" (Dynes, 1994 p.144-145).

Dynes (1994) believes that command and control is an inadequate basis for planning and that the focus should be on the problem-solving model: continuity, coordination, and cooperation. Continuity and cooperation are inherent in the emergency response initiatives of the aviation industry, because business must continue. Continuity of behavior suggests that "populations affected by the emergency will not be stunned, passive, and/or irresponsible...they will be very capable of making decisions..." (Dynes, 1994 *p.150*). Rarely, if ever, do organizations see chaos among employees following an accident. In most cases, employee dedication rises and individuals do their part to respond to the emergency and/or keep the company operating. Similar to what has been found in public sector research, airline employees do not abandon their positions based on personal safety or emotional reactions following an emergency. More realistically, employees will seek to assist and create an overabundance of volunteers. This was seen at a recent aviation accident when employees "self-deployed" to a response site, creating logistical as well as business continuity issues.

It is important that emergency plans "... concentrate on structures which facilitate coordination of a multiorganizational response. The best anticipation of that is knowledge of pre-emergency behavior and pre-emergency organizational domains" (Dynes, 1994 p.153). In the private sector, the response must be coordinated among corporate departments. Roles, responsibilities and relationships pre-emergency should be incorporated in the response phase. Just as it takes key departments to run a company on a daily basis, those same departments and relationships will be necessary to operate an efficient emergency response. Interestingly, many airlines, perhaps because of the industry culture, appear to have embraced the problem-solving model.

Response

Behavioral Aspects   Johnson's (1988) findings in *Fire in a Crowded Theatre: A Descriptive Investigation of the Emergence of Panic* are similar to that seen in aviation accident evacuations throughout the world. In 1999, American Airlines Flight 1420 crashed upon landing in Little Rock, Arkansas. The aircraft broke into three pieces as a result of the crash. Passengers utilized traditional emergency exit evacuation procedures as well as unconventional approaches, such as exiting through holes in the fuselage. Passenger accounts indicate behavioral variances along the entire continuum from cooperation and assistance to competition. Survivors provided many accounts of passengers assisting each other in leaving and moving away from the wreckage. Reports also included minimal instances of pushing and shoving as passengers exited the aircraft. The same types of behaviors were seen in August of 2001 when an AirTransat flight made an emergency landing in the Azores. During 45 minutes of powerless flight, crew and passenger reports indicate cooperative and orderly behavior. Passengers followed safety procedures; including removing sharp objects from their person and donning life vests. Accounts indicate mostly quiet solemnity and prayer, with few instances of outbursts. Upon crash landing at an airfield on an island in the Azores, passengers exited

the aircraft via emergency evacuation slides. As in the American incident described above, there were a few reports of pushing and shoving among exiting passengers, but most accounts suggested unsolicited assistance, both to other family members and total strangers. Accounts did not indicate any particular differences based on demographic or sociological variables such as age, sex, ethnicity, or nationality of those providing or receiving help.

Analysis of victim behavior in aviation accidents world-wide and other mass casualty incidents support Johnson's (1988) conclusions, "with panic defined in ideal-type terms - as selfishly individualistic flight, unregulated by social constraints - investigators continue to conclude that panic is rare" (p.24). Research also indicates, "Rather than being dazed and in shock, residents of disaster-stricken areas are active and willing to assist one another" (Mileti, 1999 p.222). As noted above, following aviation accidents, reports indicate that many passengers remain at the base of the slides to assist others with evacuation. The same types of behaviors were also witnessed following the 9/11 attack on the World Trade Center.

O'Brien and Mileti (1992) suggest there is a natural tendency for victims to help each other. Over the last 10 years mass casualty events have resulted in the creation of survivor/family support groups. These groups support each other internally, lobby for legislation and regulation, and offer support to survivors and families following subsequent accidents. This is similar to emergent groups within communities affected by disasters, as described by Mileti (1999) that persist as an organization after a disaster (p.223).

There has been considerable attention and research devoted to the concept of "community response" to disaster. O'Brien et al. (1992) concluded that, "...disasters create unity rather than disorganization. The consequence of a disaster event on a locality is in the direction of the creation of community, not its disorganization, because during the emergency period a consensus of opinion on the priority of values within a community emerges; a set of norms which encourages and reinforces community members to act in an altruistic fashion develops; ..." p. 72).

Observations of the response to disasters in the aviation industry and other private sector events tend to support these observations. Further, the observation seems to be valid, regardless of the community in question. The author proposes that "communities" can be defined as follows:

- The company which experienced the emergency
- The business industry as a whole
- The geographic location or community where the event occurred or which victims and/or families gather following the accident
- The community of residence of the victims and/or their families

Research in the public sector following disaster events shows that community members, whether affected or not, come forward to provide disaster assistance. Following the Loma

Prieta earthquake, 70 percent of community residents in Santa Cruz and 60 percent of community residents in San Francisco participated in some sort of emergency response activity. These activities included search and rescue, provision of shelter, evacuation assistance, and removal of debris (O'Brien, et al., 1992 p.79). The crash of Alaska Airlines Flight 261 was unique in that approximately half of the passengers on the plane were Alaska Air Group employees or friends and family of employees traveling non-revenue. Following the accident, many airline employees deployed to the family hotel without being officially activated. Many employees felt a strong sense of corporate "community", and wanted to help the victims' families.

The aviation industry is a very close-knit community and following an aviation accident, the impact throughout the industry is profound. While there is business competition among airlines, many employees from different airlines work out of the same setting; the airport. They see each other regularly, attend airport meetings together, and get to know each other. Following an accident, they often spontaneously offer support to the affected carrier's employees as well as to survivors and victims families. It is a common occurrence following an accident for other airlines to contact the company involved to offer support and assistance such as reservations, ticketing services, and lowest available fares for victim families.

An aviation accident can impact a local community indirectly. For example, in October of 1999, Egypt Air Flight 990 took off from JFK airport bound for Cairo, Egypt. The flight went down in the Atlantic Ocean off the East Coast of the U.S. Wreckage removed from the ocean was transported to a naval base located between Providence and Newport, RI. Because of the location of the naval base, a family support hotel was designated in Newport, RI. Families of the passengers aboard flight 990 traveled from within the U.S., Canada, Egypt, Africa, and the Sudan to Newport and spent several weeks in the hotel. The community of Newport was not directly affected by the crash of Flight 990, however, the values within the community emerged and community members' altruism shined. Residents of Newport sent flowers, cards, and banners expressing sympathy to the family hotel. On the day of the memorial service for passengers on Flight 990, residents of Newport, RI lined the streets and provided well wishes to family members. A community not impacted physically or losing any local residents as a result of the accident came out in full support of the victims of this tragic event. Similar reactions have been seen in communities around the world, including Lockerbie, Scotland after the crash of Pan Am 103; Los Angeles, CA after the crash of Alaska Airlines 261; and Nova Scotia after the crash of Swiss Air 111.

Management Aspects. Several studies have focused on public sector management of an emergency response. Current findings indicate, "local emergency management agencies are widely varied in their assigned responsibilities, in their relationships with other community organizations, in how they carry out their emergency-related tasks, and in the amount and kinds of crisis-relevant resources under their control" (Mileti, 1999 p.223). Little research is available on emergency response management in the private sector, however, the author's experience suggests research would result in similar findings. Private sector emergency management programs also vary in responsibilities. In large

corporations, there may be an individual, or individuals, dedicated to emergency management. More often, however, emergency management is assigned as a secondary responsibility to an individual or group of individuals. It is common to see a safety officer or human resource staff member assigned responsibility for developing and maintaining an emergency management program in addition to their primary responsibilities. Some corporate emergency managers have a positive working relationship with company departments, while others do not. Many are also challenged by a lack of authority to implement and enforce emergency management initiatives and available resources to ensure effective emergency preparedness and response.

The Federal Response Plan (FRP) has resulted in a model plan for public sector emergency response. The FRP "establishes a process and structure for the systematic, coordinated, and effective delivery of Federal assistance to address the consequences of any major disaster or emergency declared under the Robert T. Stafford Disaster Relief and Emergency Assistance Act..." (FEMA, 1999 p.1). The FRP organizes the types of response assistance under Emergency Support Functions (ESFs) that identify agencies involved and delineate responsibilities. The plan is built on an all-hazards approach with incident specific annexes utilized as necessary. In many cases, state and local governments have modeled the structure of the FRP in their own plans.

This type of standard planning and response model does not yet exist in most of the private sector. Over the past 3 years, the author has reviewed many aviation emergency response plans. Application of a planning model similar to the FRP within these and other private sector industries would be extremely beneficial. While corporate plans address departmental responsibilities, as opposed to various government agencies, the structure is consistent. ESFs would be representative of company departments and responsibilities would be delineated appropriately.

Within the aviation industry, the NTSB Aviation Disaster Family Assistance Plan that resulted from the 1996 mandates, has established a coordinated federal response that incorporates the private sector, in this case the airline. The plan utilizes Victim Support Tasks (VSTs), which are similar to ESFs seen in the FRP. The VSTs are shown in Figure 1.
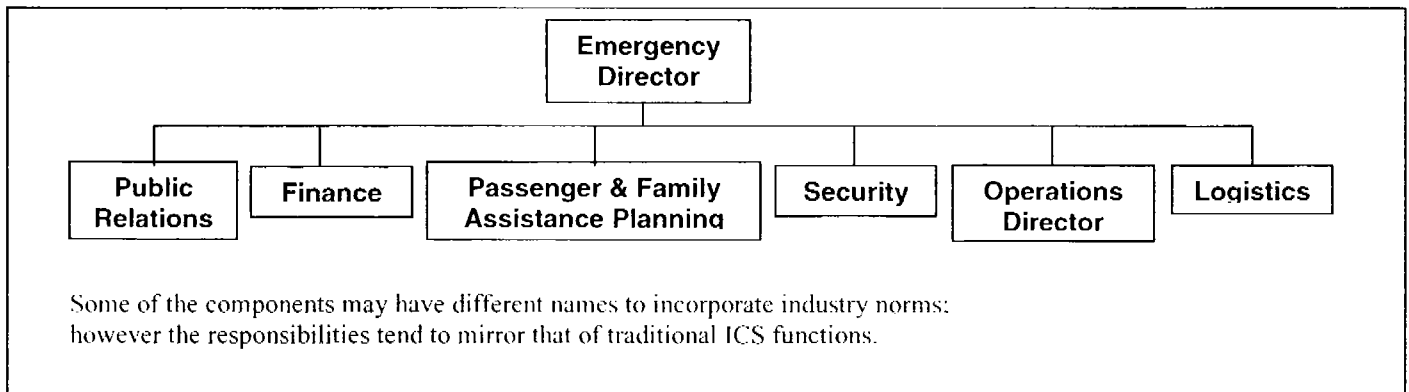
Figure 1.

VST	Assigned To	Responsibility
1	NTSB	Overall Coordination, Various - See Legislation
2	Airline	Various - See Legislation
3	ARC	Family Care and Mental Health
4	DHHS DOD	Victim Identification, Forensic and Medical Services
5	DOS	Assisting Families of Foreign Victims
6	FEMA	Communications
7	DOJ	Assisting Victims of Crime

(Aviation Disaster Family Assistance Act of 1996)

Does the aviation industry's disaster management structure differ from that of the public sector? "ICS uses principles that have been proven to improve efficiency and effectiveness in a business setting and applies the principles to emergency response" (FEMA, p.1-2). A suggested response structure for the aviation industry is seen in Figure 2.

Figure 2.


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                          ┌─────────────┐
                          │  Emergency  │
                          │  Director   │
                          └─────────────┘
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| Public Relations | Finance | Passenger & Family Assistance Planning | Security | Operations Director | Logistics |

Some of the components may have different names to incorporate industry norms; however the responsibilities tend to mirror that of traditional ICS functions.

Even with a management structure "things may not fall into place so easily... it may be far from obvious what is going on" (Scanlon, 1994 p.52). In order to improve coordination and communication, an Emergency Operations Center (EOC) is recommended. "At the EQC, the heads of various involved agencies are to share information and share in the decision making process" (Scanlon, 1994 *p.52*). The functions represented in the management structure should be present in the company's emergency operations center. Unlike local EOC's which are made up of various local agencies, the airline's EOC is made up of representatives from internal departments, with possible exceptions being representation by outside legal, insurance, and contracted vendors.

The key functions of the airline's EOC include coordinating the overall corporate response, making corporate policy and financial decisions, allocating personnel and material resources, gathering information on the accident, and providing information to the public. In contrast to the public sector, in many cases an airline's EOC is not a dedicated facility, but a room that will be transformed and serve as a command center throughout the accident response. The functions represented in Figure 3 above, will traditionally be part of the airline's corporate headquarters EOC. In addition, it will be necessary to have a secondary command center at the accident site. The 1996 aviation legislation requires establishment of a Joint Family Support Operations Center (JFSOC) at the family support hotel. The JFSOC serves as the EOC for all those involved in responding to the accident and is the forum in which coordination, decision making and information management occur.

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Recovery

"Recovery has historically implied putting a disaster-stricken community back together" (Mileti, 1999 p.229). In the public sector this includes providing individual assistance to community members, rebuilding infrastructure to pre-disaster levels, and reaching future economic growth. Individual assistance may include temporary housing, financial assistance, and relocation assistance. As noted in Neal's article Reconsidering the Phases of Disaster, "different units or groups may experience, or perceive that they experience, the different stages of recovery 1) at different times and 2) at different rates of times" (Neal, 1997 p.244). Similar parallels can be seen in the private sector. Consider the Alaska Airlines Flight 261 case study below.

Case Study

Alaska Airlines Flight 261 was a mass fatality accident off the coast of California. The accident took the lives of all passengers and crew on board. This particular flight was carrying a large number of Alaska Airlines employees, as well as employee families and friends, on non-revenue "passes". While any aviation accident has a profound impact on employees throughout the airline, the large number of employee and employee-related passengers resulted in an even more devastating impact on Alaska employees. At the time of the accident, Alaska Airlines' frequent flier program call center was responsible for conducting official notification to family members that their loved ones were confirmed to have been on board the flight. In this case, employees were essentially giving unofficial death notifications.

Federal investigation of the accident ultimately indicated the cause of the crash was failure of a component of the aircraft's tail and Alaska Airlines' maintenance procedures became a major focus. Local media was especially intense following the accident and throughout the investigation. Several unrelated events occurred on Alaska Airlines flights in subsequent months.

The local media focused heavily on these and all events related to Alaska Airlines for an extended period of time following the accident.

The accident investigation process, counseling and support for employees, continuity of operations, and reestablishing consumer confidence were inherent in the Alaska Airlines' overall corporate recovery process. According to Mileti (1999), "The process approach also stresses the nature, components, and activities of related and interacting groups in a systemic process and the fact that people experience recovery differently" (p. 230). Recovery for Alaska Airlines, as with many airlines experiencing an accident, was a difficult process and recovery rates varied. Some employees and departments moved through the recovery process more quickly than others. It was found that in many cases, employees who conducted notifications or those who were involved in maintenance had a more difficult recovery process and required additional support. Events and media influences beyond the airline's control impacted recovery activities and timelines.

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Mitigation

Mitigation is defined as preventing damage from a disaster before it occurs or reducing the effects if it does occur. After a disaster, mitigation activities can reduce the risk of another disaster or lessen the effect if a future disaster occurs. (Godschalk, 1991) Public sector research on mitigation suggests that unfortunately, due to political and cultural beliefs, the emergency manager does not enjoy full support in mitigation initiatives. Programs such as land-use regulations and relocation initiatives are not always understood or agreeable to politicians or the public. "Emergency management is an intensely political arena. Issues range from how much risk a community is willing to accept and how much money it is willing to spend to reduce that risk to what kinds of programs should be developed to address the long and short term effects of hazards and disasters" (Waugh, 2000 p.159).

Mitigation activities in the aviation industry can be categorized as structural or non-structural. Structural mitigation may include aircraft maintenance and structural design changes. Non-structural mitigation utilizes regulatory, management and programmatic implementation to promote safety and security. Mitigation activities in the aviation industry, like the public sector, are extremely political. In most cases, mitigation policies have resulted from accidents and the ensuing investigation process. The National Transportation Safety Board (NTSB) is an independent federal agency that investigates every civil aviation accident in the United States and issues safety recommendations to prevent future accidents. Unfortunately, the NTSB can only recommend changes, not implement or enforce their findings. As Godschalk (1991) suggests, "how risks are perceived shapes the way people respond to them. If local officials do not perceive hazard risks as important, they will not give mitigation programs high priority" (p.148). Similarly, how aviation safety risks identified by the NTSB are perceived by the Federal Aviation Administration and the airline industry as a whole will affect the priority placed on implementation. Waugh states that individuals "...oppose the adoption of strict land-use regulations and building standards and too often successfully prevent their adoption. They argue that such regulations will increase costs..." The majority of recommendations submitted by the NTSB are not implemented. As in the public sector, the question is whether financial and other concerns outweigh the potential costs of not mitigating disasters. "The lack of appropriate regulations and standards can result in tragic losses if a disaster occurs" (Waugh, 2000 p.155).

Conclusion

Little research has been conducted in the private sector based on the comprehensive emergency management model. Based on the comparisons in this study, the model is easily adapted to the aviation industry and likely other private sector industries. A review of the research within public sector research indicates strong similarities to experiences in the aviation industry. These parallels suggest that findings from public sector research can be applied to the private sector. It is possible, however, that emergency managers in the private sector are less likely to seek out public sector research and assimilate findings. Analysis of this research and application of results offer the private sector important tools

to improve emergency preparedness and planning initiatives. Increased public-private partnerships and networking, as well as research directed towards the private sector should be supported and encouraged in order to broaden and further strengthen the field of emergency management.

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Bibliography

Aviation Disaster Family Assistance Act of 1996, Pub. L. No.104-264, Title VII (1996)

Dahlhamer, James, M. and D'Souza, Melvin J. (1997). Determinants of Business Disaster Preparedness in Two U.S. Metropolitan Areas. *International Journal of Mass Emergencies and Disasters, Vol.15,* 265-281.

Dynes, Russell R. (1994). Community Emergency Planning: False Assumptions and Inappropriate Analogies. *International Journal of Mass Emergencies and Disasters, Vol.12,*141-158.

FEMA. Basic Incident Command System (ICS): Independent Study. Unit 1, page 1-2. Emitsburg, MD: FEMA.

FEMA (1999). Federal Response Plan. Emitsburg, MD: FEMA.

Godschalk, David. (1991). Emergency Management: Principles and Practices for Local Government. Washington, DC: ICMA

Johnson, Norris R. (1988). Fire in a Crowded Theater: A Descriptive Investigation of the Emergence of Panic. *International Journal of Mass Emergencies and Disasters, Vol.6 (1),* 7-26.

Mileti, Dennis S. (1999). Disasters By Design: A Reassessment of Natural Hazards in the United States. Washington, DC.: Joseph Henry Press.

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Neal, David M. (1997). Reconsidering the Phases of Disaster. *International Journal of Mass Emergencies and Disasters, Vol. 15 (2), 239-264.*

O'Brien, Paul and Mileti, Dennis S. (1992). Citizen Participation in Emergency Response Following the Loma Prieta Earthquake. *International Journal of Mass Emergencies and Disasters, Vol.10 (1), 71-89.*

Scanlon, Joseph. (1994). The Role of EOCs in Emergency Management: A Comparison of American and Canadian Experience. *International Journal of Mass Emergencies and Disasters, Vol.12 (1), 51-75.*

Waugh Jr., William L. 2000. <u>Living with Hazards: Dealing with Disasters: An Introduction to Emergency Management</u>. New York: M.E. Sharpe, Inc.

First Annual ASPEP Student Writing Contest

Historically emergency management in the United States began during World War II because of the realization that the citizens had no defense against enemy attack while our military troops were fighting overseas. The earliest civil defense forces were volunteers in the Ground Observer Corps. The concept grew and was legally formalized with the Civil Defense Act of 1950. Through the years the field has changed enormously to include such concepts as all hazards planning, comprehensive emergency management and use of incident management tools. More and more emergency managers are being trained in university programs in emergency management. Many "allied fields" of study now include principles and practices of emergency management in their programs.

The American Society of Professional Emergency Planners is dedicated to the advancement of the profession of emergency management. Among the elements that define a profession is the need for a body of knowledge relating to the subject and practitioners continuing to add to that body of knowledge. To further that goal, ASPEP now sponsors an annual student writing contest to encourage students to publish new and innovative ideas.

This year a number of students from around the world submitted papers. Many were outstanding and we commend each student author for their participation and effort. Each of the submissions was read and evaluated by a subcommittee of the ASPEP Journal Committee. The Editor would like to thank Avagene Moore and Nancy Crowley for their time and professionalism in this additional responsibility. These individuals not only read each submitted student article but worked with the winners to improve their article before being included in this year's Journal.

The winners of this contest have their article published in this year's Journal, received an invitation to present their paper at the Annual Conference of the International Association of Emergency Managers (IAEM) in November 2003, and received a monetary prize. The 2003 winners are as follows:

First Place ($150): "Disaster Myths and the Media", Rochelle E. Brenner

Second Place ($100): "Integrating Critical Care Transport Resources into an Emergency Management Plan", John L. Levitow, Jr.

Third Place ($50): "Triage and Ethics during the Catastrophic Mass Casualty Incident", Daniel Neal

In January 2004, ASPEP hopes to announce the second annual student writing contest. We encourage all members of ASPEP and University facilities to encourage students in emergency management and related fields to consider writing an original paper for next year's contest.

Disaster Myths and the Media:
A Survey of the Media's Perception of Disasters

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INTRODUCTION

The news media is the primary source of disaster information for the majority of the public. Whether it portrays images of forlorn tornado victims wandering their flattened property or women and children running out of hurricane-ravaged homes carrying televisions and stereos, the media serves the role of bringing an audience to a disaster. But that image may not correctly portray what usually happens in a disaster - or even what is common during that particular disaster.

Because most people will never experience a disaster themselves, media images may be the dominant source of information that forms a person's perception of what happens. Sources of information about disasters include peers, disaster-related executives, movies and books. But no agency has the power to reach a mass audience like the media. The information provided by newspapers, radio stations and television stations often form and change people's viewpoints of the world around them.

Some researchers have conducted studies that show the media reinforces mythical ideas about disasters. Disaster myths include the belief that panic is a major problem following disasters, looting commonly occurs, martial law is often declared during disasters, the crime rate rises after a disaster, most people evacuate quickly, victims are in shock and helpless and evacuees usually go to public shelters. (A more complete explanation of what the myths are is provided in Appendix I.)

When researchers asked members of the public and emergency management executives questions relating to the myths, their belief rate was relatively high. (See Table 1.) The same was found to be true when a professor posed the question to a group of University of Richmond students taking an Emergency Services Management class.

This paper asks those same questions to members of the media to help shed light on whether media reporters believe the myths as well. There are already a plethora of studies that show media outlets reinforce myths by examining the product (articles, news programs), but no studies have shown that the people working in the media actually believe the myths. The results of this survey will hopefully show whether the media needs to learn the truth about the myths, and whether it needs to reexamine its inadvertent promotion of myths.

The primary goal of this survey is to determine whether reporters believe some of the most widely believed disaster myths. The secondary goal is to identify what myths are

most likely to be spread through the media and what type of media is most likely to spread myths.

METHODOLOGY

A survey with eight questions (which is copied in its entirety in Appendix 1) was distributed to 42 television reporters, 15 radio reporters and 45 newspaper reporters in the media market of south-central Pennsylvania. Seven questions deal with seven myths.

One additional question asks whether the media respondent relies on emergency managers as sources of information. That question was included to give some indication of whether information is flowing directly from emergency managers to the public via the media. However, the statistical analysis of the belief in myths does not calculate the results of that question because using information from disaster managers is not necessarily promoting myths.

Television recipients included NBC affiliate WGAL-8, FOX 43 television reporters, CBS affiliate WHP and WITF-TV, the public television station. Newspaper recipients included reporters at the Hanover Evening Sun, York Dispatch, Harrisburg Patriot-News and reporters in the Harrisburg Capitol bureau. The radio recipients included reporters at Radio PA, Pennsylvania Public Radio based in the Capitol, WHP radio, WSBA (an AM talk station), and WITF-FM, the public radio station.

The survey was distributed via e-mail and most responses came by e-mail, although some people printed out the survey and marked off their responses. Eleven newspaper reporters, three television reporters and six radio reporters filled out the survey. Because of the varied and low response rate among differing types of media, this paper could not draw any conclusions about what type of media is most likely to spread myths.

ANALYSIS

The results of the survey show that the belief rate in the seven myths was 31 percent, lower than any other group surveyed. However, there are several potential areas for error that could have affected the results.

1) The number of media representatives interviewed is relatively small. With 11 responses, newspaper reporters had the most responses and the most "incorrect answers." Given that statistic, it may be an indication that if more people respond, the belief rate will be higher.

2) Those who responded to the survey are people who may have already had an idea of the correct answers. Therefore, reporters who are not interested in disaster coverage or have little knowledge of them may have been hesitant to respond to the survey.

3) Survey respondents came from a small number of newsrooms, indicating that they may have had similar experiences or understanding of disasters.

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4) Survey respondents cover a limited geographical area that is not prone to frequent widespread disasters. There are extensive floods every couple years, but it is unknown whether all respondents had the opportunity to cover any disasters.

5) The definition of disaster for each respondent may be different. Some may have included riots, fires, nuclear accidents, etc. in considering their answers.

6) Various media outlets were not equally represented in the survey.

Still, a study of the 1993 media coverage following Hurricane Alicia in Galveston and Houston, Texas, seems to confirm the results of this survey. Dennis Wenger and Barbara Friedman's study, "Local and National Media Coverage of Disaster: A Content Analysis of the Print Media's Treatment of Disaster Myths" found that 29 percent of the 113 stories in the Houston Post referenced disaster myths. Although that study analyzes content and has a larger base of information, the percentage of stories with myths almost mirrors the belief rate as determined by this study.

While the media belief rate is lower than emergency managers, the graduate students in the Social Dimensions of Disasters class and the public, it is still a high percentage. For each reporter that believes the myth, it can have exponential consequences when the myths are portrayed in print or over the airwaves to hundreds or millions of people. For every media report that shows a disaster myth, many people may form a long-lasting opinion.

Unfortunately, the lower belief rate in myths reflected in this study does not necessarily mean that reporters are less likely to spread disaster myths. A high number of "uncertain" responses could indicate the proliferation of myths among the media is higher than would be assumed simply based on those who "agree" with the myths. One notable statistic in the survey is the result that shows 80 percent of reporters believe panic flight is a problem. That indicates it is by far the most widely believed myth among the media.

LESSONS LEARNED

The results of this survey are valuable because it could help media outlets and emergency managers make better decisions regarding educational efforts to dispel myths. Clearly, the myth about panic flight is the most pressing problem and should be the priority in any effort to educate the media about disaster myths.

In addition, the survey has shown that 80 percent of reporters trust emergency managers to provide factual information during or after a disaster. Knowing that the information from emergency managers could be spread unchecked through the media (and on to the public) should be a wake-up call that myths need to be properly addressed through the ranks of managers as well.

The media should also take note that some of the myths, while not believed by the reporters, are widely believed by the public. That should be taken into account when delivering news reports. Perhaps the media incorrectly assumes that its images of people fleeing an area or crowding public shelters will be taken in context of being the extreme situation, whereas most people are behaving calmly or going to a friend's house. The media may know what the truth is without telling that to the audience.

This survey seems to reveal a disconnect between disaster behavior that reporters believe to be true and the disaster images they end up giving the audience, if studies about media content are accurate. The media needs to be more aware of the impact of its compelling stories and how they perpetuate myths.

Appendix I

ANSWERS TO DISASTER SURVEY

This explanation of the disaster survey is being provided to all respondents of the survey that indicated they would like an explanation of the answers. All but one of the people who responded asked for the results. The explanations are basically an edited version of the answers given to others who took the survey.

1. A major problem community officials confront when faced with a natural disaster is controlling the panic of people fleeing the danger area.

The Myth: The most common disaster response is panic.

When people are warned of disaster, they are reluctant to believe the warning initially. If they are impacted without warning, their behavior continues to reflect self-control. In most circumstances, people are likely to engage in behaviors that reduce the chance of injury to themselves and those nearby.

2. Looting commonly occurs after the impact of natural disasters.

The Myth: Before a disaster, and even more so afterwards, widespread looting occurs.

Typically, little or no looting occurs after a disaster, contrary to the public expectation. In a review of over 300 field studies, the Disaster Research Center uncovered extremely few verified cases of looting. There are exceptions, however. Looting does occur when certain social conditions exist.

3. Martial law has been instituted in disaster areas in the United States.

The myth: Following disasters, martial law usually is declared to curb looting.

Martial law is the absorption of total authority by a military unit and has never occurred in the U.S. However, military response in disasters is often incorrectly called martial law. In some disasters, National Guard units may help enforce curfew or in extreme cases like Hurricane Andrew, federal military units will be stationed. Some areas are evacuated or temporarily restricted. These actions do not constitute the imposition of martial law.

4. The crime rate of a community usually rises after it has experienced a natural disaster.

The Myth: The crime rate usually increases after disaster.

Research findings have shown that the opposite is true in most cases.

5. When warned of an impending disaster, most people are quick to evacuate the threatened area.

The Myth: Most people are quick to evacuate a threatened area.

People believe that disaster responses are characterized by disorganized flight by hysterical individuals. Among most disaster victims, there is a reluctance to leave their homes when threatened by floods or other hazards, even after a warning is issued. Even in disasters such as fires, most people will leave in an orderly fashion until it is too late.

6. Immediately after the impact of a disaster, most victims are in a state of shock and unable to cope with the situation themselves.

Myth: People struck by disaster are helpless victims and everything will have to be done for them.

Research demonstrated high levels of activism among victims who work out their own forms of help, mutual assistance, and evacuation locations. "Disaster syndrome" does not usually occur, and people are able to respond to the trauma within a matter of seconds, and at most a few hours. There are a few exceptions after highly traumatic events.

7. Emergency management officials are reliable sources during disasters and can be trusted to explain what is happening or what is expected to happen.

This is not a myth. However, it should be noted that emergency management executives have a 55.7 percent belief rate in disaster myths. Therefore, their expectations and the information they provide does not necessarily reflect what is expected based on research findings.

8. Most people who evacuate during a disaster go to a public shelter.

Myth: Most people go to a public shelter.

Social research findings have shown that people will only go to public shelters as a last resort. Most people, typically 80 percent, will stay with relatives or friends. Others will go to second homes, private firms, hotels or motels, or another location.

Integrating Critical Care Transport Resources into an Emergency Management Plan

John L. Levitow, Jr.
American Military University

Since the terrorist attacks of September 11, 2001, emergency management has become a major focus of local, state and federal governments. Federal, state and local governments have been reviewing and updating emergency management plans in order to meet new threats. While governments are developing or adding new resources to combat terrorism and weapons of mass destruction, it appears that a valuable resource is being overlooked. Critical care transport (CCT) programs are typically privately owned and operated, and have the sole purpose of moving the critically ill and injured. While the use of these programs is well defined in a mass casualty incident, they do not appear to be well defined in a terrorist attack, natural or technological disaster. The purpose of this paper is to understand the issues of utilizing CCT programs as a resource beyond their traditional role of caring for the critically ill and injured.

In order to discuss the issues, it is important to properly define the elements of a critical care transport program. All CCT programs provide similar services, but may differ in the following aspects: transport vehicle utilized, aircraft limitations and crew composition. There are three modes of transportation that are utilized by CCT programs: helicopter (rotor-wing), airplane (fixed-wing) and ground ambulance. Aircraft limitations are a second area in which the CCT programs may differ. Third, scope of practice provided by CCT can vary.

Rotor-wing aircraft have been utilized in many disasters and have performed many different tasks. "During the last four decades, helicopters have proven their value to communities when disasters strike"(2) Governmental, military and private rotor-wing assets have been relied upon in the process of providing disaster relief. While EMS helicopters are configured for transport of the critically ill and injured (2), they can be utilized for non-medical missions (e.g. moving supplies, personnel, damage assessment).

As widespread as EMS helicopters have become, it is rare that they are used to respond to large disasters. (2) EMS helicopters may be configured for the primary mission of caring for and transporting patients, but there is a role for them to operate in large-scale disasters supporting medical efforts. By way of example, in 1999, Hurricane Floyd caused major flooding in eastern North Carolina. The local CCT program's (Eastcare) rotor-wing aircraft was utilized for both medical and non-medical missions. (3) These non-medical missions included flying supplies and moving staff to and from medical facilities. "Eastcare flew more than 200 missions in a 10 day period following Hurricane Floyd. Eastcare met regional needs for patients, staff, supply and equipment transport during the natural disaster."(4) While these non-medical missions were not transporting the critically ill and injured, these missions were supporting the delivery of health care to those affected by the disaster.

The biggest obstacle for the utilization of medically configured aircraft in disaster operations is a lack of knowledge. "Many emergency planners do not possess a high level of expertise in vertical flight operations nor can it be assumed that they have ready access to information on the subject."(2) Education of both the CCT program managers and emergency planners is the key to integrating a CCT rotor-wing asset into local and state disaster operations.

The Federal Aviation Administration produced an advisory circular to address the issue of integrating rotor-wing aircraft into disaster relief operations. "The provisions in this advisory circular are intended to incorporate helicopters and tilt rotors into existing plans or into new plans as they are being developed."(2)

Germany provides a great example of the integration of EMS helicopters into a national disaster plan. "In the case of a disaster in Germany all [civil] resources are available for use in those circumstances. As an example, during the most recent flood disaster, several Helicopter Emergency Medical Services (HEMS) operators helped to evacuate hospitals as part of a standard response plan."(5) The application of rotor-wing aircraft by Germany demonstrates an ability to think creatively about the use of all assets at their disposal.

In the United States it is assumed that ground ambulances will be the primary transport mode of patients in a disaster. (2) While the ground ambulance should be the primary transport mode, the rotor-wing asset should also be considered in disaster relief efforts. Utilization of rotor-wing assets allows patients to be transported to hospitals that are not impacted by the influx of patients. Additionally as in Germany the aircraft can be utilized in situations where roads are damaged or impassable.

While there is a strong push or desire to integrate rotor-wing assets into a local/state/federal disaster plan, there is still a question about appropriate utilization. There are medically configured aircraft across the United States that have multiple missions. The Maryland and New Jersey State Police aircraft perform both EMS and police missions. Additionally, fire service-based aircraft such as those operated by Los Angeles Fire department perform both EMS and fire missions. It does appear that when a municipality operates their own rotor-wing assets, they are more likely to include them in an emergency management plan. Hospitals and healthcare systems rotor-wing assets are not always considered.

While the use of CCT program's rotor-wing assets should be considered, there is a question about the appropriateness of using this asset for non-medical operations. The lack of medically configured rotor-wing aircraft contributes to the concern or appropriately of rotor-wing aircraft from a CCT program. "In the event of future terrorist attacks in America, do states have adequate medical helicopter services to transport the injured or ill for care?"(6) A study was conducted in Massachusetts in an attempt to answer this question. The data has been collected in this study, but no conclusions were made from the data. Liz Garthe, president of Garthe Associates did make the following

statement after the study was completed: "Air Medical Transport is the tip of the pyramid in emergency response systems. It's necessary for states to get a handle on this for emergency preparedness planning."(5)

In addition to caring for and transporting the critically ill and injured, these aircraft can and have been used to move personnel, supplies and equipment and in some cases assist in search and rescue missions. While the CCT rotor-wing aircraft have a specific mission and configuration, this does not mean they cannot be used for other missions. Guidelines must be established in the disaster planning process to ensure that rotor-wing assets can be used. (2) In other words it may not be practical to place water buckets on a CCT rotor-wing aircraft and expect the pilots and crew to perform water drops during a wildfire. However it would be a practical application of a CCT rotor-wing aircraft to transport medical disaster packs and medical personnel to the site of the disaster.

In order to utilize a CCT rotor-wing asset in disaster operations the emergency manager must know the limitations of the aircraft. Additionally if this asset is utilized for non-medical transport missions, the ramifications of the aircraft not being available for medical missions must be taken into consideration.

In addition to CCT programs utilizing rotor-wing aircraft a good number of programs operate fixed-wing aircraft and ground critical care units. In the course of gathering research it was difficult to locate any information on the utilization of CCT fixed-wing aircraft in disaster management. However CCT programs do commit aircraft for evacuation of medical facilities that are threatened by a natural disaster.

In 1999 a CCT program based in Charlotte, North Carolina, Med Center Air committed three ground units and three fixed wing aircraft to assist in the evacuation of medical facilities. Over the course of the next two days, patients were transported from health care facilities that were threatened by Hurricane Floyd. After the storm made landfall these same assets were utilized to return these patients to the health care facilities that were initially evacuated.

In the Federal Response Plan-Health and Medical Services Annex, patient evacuation is addressed. "National Disaster Medical Service patient movement will primarily be accomplished utilizing fixed-wing aero medical evacuation resources of DOD. (Department of Defense)"(7) While the military has a large number of fixed-wing aero medical evacuation resources, there are civilian resources that may be utilized.

The CCT fixed-wing aircraft does not have the capability of transporting many patients like a C-17 or C-130. Military assets can definitely transport a large amount of cargo, but these aircraft need large airfields to land and take-off. In addition the DOD may not have the resources that are required to move patients because aircraft and crews are being deployed all over the world to support the War on Terrorism.

Civilian CCT fixed-wing aircraft have the ability to operate on smaller airfields and are in abundance in the United States. The concept of utilizing civilian CCT aircraft appears to

be one that has not been fully addressed. There may be isolated local or state governments that have included these fixed wing assets into an emergency management plan, but unless these assets are more broadly recommended for incorporation into disaster management plans, we may not see their use increased.

Ground ambulances have always been an integral part of the response to a disaster. In the "Guide for All-Hazard Emergency Operations Planning," the role of emergency medical services (EMS) is defined. The documents state that EMS will, "Respond to the disaster scene with emergency medical personnel and equipment, triage, stabilize, treat, and transport the injured."(8) How might a CCT ground program be incorporated? CCT ground programs operate ground ambulances that have the sole purpose of transporting the critically ill and injured during inter-facility transports. While these transport units do not operate in the pre-hospital arena, they could be utilized to transport patients from the site of a disaster. Local and state laws may have to be altered if the CCT ground units do not have a license to provide pre-hospital care. There was not sufficient documentation found to identify routine use of CCT ground ambulances in emergency management plans.

Generally speaking, CCT programs are able to offer patients a higher level of medical care than local emergency medical services. While the level of care may be more sophisticated than local EMS, the CCT's crew configuration may not be conducive to practicing in the pre-hospital environment. Most CCT programs across the United States employ a registered nurse and paramedic. (1) There are various other configurations such as: nurse/nurse, nurse/respiratory care practitioner, nurse/MD and single paramedic. (1) The utilization of CCT programs will vary according to local law and provider agreements with the individual programs.

In addition a number of CCT programs do not operate with a paramedic or personnel with experience in pre-hospital operations. The lack of personnel with pre-hospital training and certifications could be one reason the CCT ground ambulances are not utilized. Emergency managers must embrace the required training to allow personnel to function in other roles.

The Air & Surface Transport Nurses Association (ASTNA) produced a position paper, "Role of the Registered Nurse in the Pre-hospital Environment", (9) that states, "Registered nurses have participated in the pre-hospital care environment for many years and their role as providers of care during patient transport by air or ground has been well documented." (9) The registered nurse has been an integral part in the process of developing paramedicine in the United States.

Others argue that training in pre-hospital care is not typically a skill set taught to registered nurses and thus they are ill prepared to operate outside a controlled environment. While there may be a valid argument against the utilization of a nurse in a pre-hospital setting, there is clearly a place for the nurse in disaster relief. The nurse could be utilized in the triage or treatment area at the site of the disaster, and/or be utilized to care for patients during transport. State and local laws that prohibit the nurse

from practicing in the pre-hospital environment will need to be revised or rewritten. "ASTNA believes that qualified nurses practicing in the pre-hospital environment should not be required to certify as emergency or flight medical technicians, at any level, before assuming a nursing role in the pre-hospital environment provided they have obtained the appropriate knowledge and demonstrated skill proficiency unique to the delivery of pre-hospital care and are not designated as first responders or provide search and rescue." (9)

The author posted a question on two Internet list-servs: How are private medical transport resources integrated into local emergency management plans? The question was posted on the International Association of Emergency Managers list-serv (IAEM-List) and Flight Web (Air medical Community list-serv). There were only two responses to the question and the opinions varied about the utilization of rotor-wing aircraft in disaster relief. One view was that helicopters were not a resource that could be relied on because of landing zone requirements, limited transport capability and slow turn around time. (10) The second statement supported using a helicopter to deliver a Disaster Area Response Team (team comprised of emergency MDs, RNs and respiratory therapists) or to move patients form the disaster site. (10) In one of the responses the utilization of ground critical care units was addressed. It was stated that the local resource took about an hour to respond but could be utilized if the situation warranted. (10) With only two responses to the question, it is difficult to determine if the resources of CCT programs are utilized in disaster relief. In fact, the utilization of the CCT rotor-wing aircraft is the only resource that was addressed by both responses.

There is a role for using a helicopter in disaster operations but it seems it is a resource that is only considered to transport the critically injured. Information presented clearly shows there are other ways a CCT helicopter can be utilized in a disaster.

The inclusion of CCT rotor-wing, fixed-wing and ground assets has been discussed but there is no way to determine their present inclusion in local and state emergency management plans. In order to make some conclusions about the utilization of CCT resources in state and local emergency management plans research must be conducted and recommendations for inclusion presented. The research would need to identify how CCT resources are utilized in this country. A survey model would be a good tool to obtain this information. The subjects of the survey would be all of the CCT programs and state emergency management agencies. The survey questionnaire might address the following questions:

      1.) Are critical care transport resources utilized in emergency management plans?
      2.) What critical care transport resources are available?
      3.) What is the crew configuration of the CCT resources?
      4.) How is each of the CCT resources utilized?
      5.) How are the CCT personnel utilized in disaster operations?

The results of the questionnaire could be utilized to identify how CCT resources are used across the country. In addition the published research could be used to introduce the idea of utilizing CCT resources to both emergency managers and CCT program management. The research would become a tool that both CCT programs and emergency mangers

could utilize to integrate resources and personnel into existing plans. Additionally it will allow agencies to address the benefits and limitations of the CCT resources.

The threats of terrorism have forced local, state and federal governments to reevaluate emergency management plans. The new Department of Homeland Security was developed to improve the United States response to terrorism and disasters, both natural and technological. While emergency managers are developing and reviewing emergency management plans, it appears that a beneficial resource is not being considered. Critical Care Transport programs have rotor-wing aircraft, fixed-wing aircraft, and ground critical care units that could be utilized in disaster relief. These assets could be used to augment and enhance an emergency management agency's ability to respond to a disaster or terrorist attack.

Bibliography

1.) Holleran R: Air & Surface Patient Transport Principles & Practice, St Louis, 2003, Mosby.

2.) Integrating Helicopter and Tilt rotor Assets into Disaster Relief Planning, Retrieved January 02, 2003, from http://www1.faa.gov/avr/afs/acs/00-59.txt

3.) Sahni R., Velenock S.: The Scope of the Flood and Specific Challenges, Air Medical Transport Conference, Salt Lake City, 2000.

4.) The Brody School of Medicine: Eastcare Transport Program Named Best of the Year, Retrieved on January 02, 2003, from http://www.ecu.edu/med/NewsAndEvents/NewsReleases/NR_EastCare_Best.htm

5.) Drwiega A: EMS Post 9/11, Defense & Public Service Helicopter, Vol 21: No 6, Shephards

6.) States Emergency Planning Overlooks Medical Helicopters, Retrieved January 02, 2003, from http://web.lexis-nexis.com/universe/document

7.) FEMA: Federal Response Plan – ESF#8 –Health and Medical Services Annex, Retrieved January 02, 2003, from www.fema.gov/rrr/frp/frpesf8.shtm

8.) FEMA: Guide for All Hazard Emergency Operations Planning, Retrieved January 10, 2003, from http://www.fema.gov/ptc/slg101.pdf

9.) Air and Surface Transport Nurses Association (ASTNA): Role of the Registered Nurse in the Prehospital Environment, Retrieved January 31, 2003, from http://www.astna.org/Position-papers/HOSPENV.htm

10.) IAEM-List: Utilization of private medical resources in a disaster, Posted February 01, 2003

Triage and Ethics During the Catastrophic Mass Casualty Incident: Can They Coexist?

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Triage is the process of sorting patients based on their injury severity and survivability. Triage is used in a variety of areas, including emergency medical services (EMS) systems and hospital emergency departments. During a mass casualty incident (MCI), a large number of patients present to an EMS system or hospital. In simple terms, the resources and personnel of the facility are overwhelmed by the number of casualties. Unable to treat all of the casualties simultaneously, the patients are sorted by severity and survivability. This use of triage is essential to managing a large number of casualties from an MCI.

In the case of a catastrophic natural disaster or an attack using weapons of mass destruction, the number of casualties could be catastrophic. This would create strains upon the existing system of triage. Resources and personnel would be completely overwhelmed. Furthermore, a catastrophic disaster or WMD event could severely damage the existing health care infrastructure. Without sufficient hospitals, EMS resources, and transportation infrastructure, triage would have to change tremendously. Existing triage is based upon treating patients and moving them to a hospital for further treatment. Following a catastrophic disaster, triage may have to sort patients into categories based upon their survivability over days. How must traditional triage practices change when confronted with a catastrophic number of casualties? What are the special ethical considerations that would need to be addressed in this situation?

Discussion

"Triage is derived from a French verb *trier* which means 'to sort'." (1) "It is defined as the selection and categorization of the victims of a disaster with the view to appropriate treatment according to the degree of severity of illness or injury, and the availability of medical and transport facilities." (2) The goal of triage is to "do the greatest good for the greatest number."(3) Resources should not be used on patients with mortal injuries nor patients with superficial injuries. Instead, resources (which are already scarce) should be focused upon those patients who will survive with minimal intervention. (1)

"The performance of triage raises important ethical issues." (2) First, sorting patients to determine who receives care first is an important issue. "To sort is to assign value, according to a system that may or may not be explicit." (4) Leaning points out that a physician's code of ethics "squarely assigns to the physician the responsibility of protecting the interests of the individual patient in all situations." (4) Furthermore, "the physician is enjoined to refrain from a calculus that incorporates any consideration other than the patient's well-being." (4) This is in direct conflict with the individual patient's needs versus overwhelmed resources and "the greatest good for the greatest number".

The START triage system is used in many EMS systems. START stands for Simple Triage and Rapid Transport. In the START system, patients are categorized into four categories: Red, Yellow, Green, and Black. (1) The Red category is for patients who are critically injured and require immediate treatment. Yellow patients are injured and require care however they can survive for a short period of time without intervention. Green patients are often categorized as the "walking wound". These patients will survive without medical intervention and are often capable of caring for themselves. (1) Lastly, "Black-tagged patients, also known as Expectant patients, are deceased or have such catastrophic injuries that they are not expected to survive to be transported." (1) It is important to note that only patients who are not breathing or pulseless (using the START algorithm) are marked as black-tagged.

Pledger describes two types of triage: utilitarian and egalitarian. (5) "Utilitarian triage seeks to achieve the greatest good for the greatest number by the use of factors such as the likelihood of medical success; the immediate contribution of the patient in the prevailing circumstances; the conservation of scarce resources; the role of the patients; and the general social standing of the patient." (5) START triage is an example of utilitarian triage. Egalitarian triage seeks to "restore equality for those in need by the selection of those with the greatest medical need or some other disadvantage; or by treating patients on a first come, first served basis; by random selection; or by treating none if not all can be saved." (5) Pledger suggests that neither of these methods are completely fair since an advantage is created for some group in each situation. (5) "Even random selection by lottery after triage would be fairer than queuing, since it would put an equal value on every life, but it would still favor the early arrivals and would be difficult to organize." (5) However, Pesik et al. concede that (in a disaster) patients suffering from multiple diseases, alcohol abuse, and the homeless may respond poorly. (6) Although, under normal circumstances, they "should not receive a lower priority, it appears in a catastrophic triage situation that appropriate medical resources may not be available to treat these groups." (6)

Domres et al. point out that triage is much different during a disaster. (2) "As disasters are characterized by a shortage of personnel and material resources, the performance of triage, in those situations, is not identical to the triage used in the provision of routine emergency medical services in which the availability of life-saving resources, for the most part, are sufficient." (2) During a disaster, the triage process is decentralized, occurring at multiple sites or compartments simultaneously throughout the disaster zone. (7) During START triage, patients are triaged with the assumption that healthcare facilities and transportation systems are intact and undamaged. The use of the START system would be ineffective in this situation as a large number of patients would be tagged for immediate care and transport. This would not be possible with the associated damage to the transportation system and EMS infrastructure. Medical care from outside of the affected region may not be able to reach the affected area. (9) In this case, the START-SAVE algorithm is proposed. START-SAVE is an acronym for Simple Triage and Rapid Treatment – Survival at Victim Endpoint.

The SAVE triage is designed to answer two key questions: 1) What is the victim's prognosis if minimal treatment is provided? 2) What is the victim's prognosis with treatment using the resources available at the disaster medical aid center? Patients are triaged to a treatment area under two conditions: 1) Morbidity or mortality may be reduced with treatment, given the estimated time until there is access to definitive care; 2) Treatment will not consume an inordinate amount of limited resources and personnel available. (7)

In simpler terms, patients are treated based upon the statistical survivability of their particular injury. If the patient's prognosis is good with minimal care, the patient is moved to a treatment area. Conversely, if the patient's prognosis is poor with minimal treatment provided, then the patient is moved to an observation area where palliative care is administered. For example, in the traditional START algorithm, a hypotensive patient with an open abdominal wound would be categorized as "Red". Under the START-SAVE system, this same patient may be categorized as "Expectant" and placed in the observation area.

Triage on the battlefield is different than the civilian world. "In the armed services treatment of casualties may be of secondary importance to achieving victory, and those with less serious injuries may be treated first." (5) The focus upon treating the least injured first allows these soldiers to be returned to the battle. Dolev reiterates that the military's approach to triage on the battlefield is not purely for humanistic reasons, but rather for considerations of expediency. (8) "The primary objective was to allow the fighting force to attain its mission." (8) "Secondary considerations related to moral and social values." (8)

One of the tasks of military medicine is to direct lightly wounded soldiers, as well as those who have completed their convalescence period, back to their units. This concept is based on the assumption that injured soldiers who have seen battle are a major source of reinforcements of trained and experienced troops.

"Return-to-duty" (RTD) is a technical act whereby a soldier, recovering from a battle wound, is sent back to the front line, in most cases to his original unit. (8)

During World War II, RTD served as an important source of reinforcements for the German Army in Russia. (8) It was also used successfully in Vietnam by the U.S. troops. (8)

"Classification of casualties using military perspective – "treat combatants with minor injuries first" – may sometimes be necessary under extreme war conditions. However, extreme war conditions may also create extreme human rights violations for victims, if the classifications for triage are not founded upon humanitarian law." (2) In a study of ethical concerns for physicians deployed to Operation Desert Storm, Carter found that "thirty-three and one-half percent of respondents disagreed with the statement 'The only medical criteria used for triage should be medical status'." (10) Nearly one-quarter of the physicians surveyed responded that enemy prisoners should receive care only after allied forces have been treated. (10) This is directly contrary to the Geneva Convention. (10)

Pesik, Keim, and Iserson described a system similar to RTD when triaging at a WMD incident. (6) They described this system as the 'multiplier effect'. Pesik et al. described the multiplier effect at a terrorist incident in which health care providers should be triaged before other patients.

A well-established ethical principle is that health care providers should first look to their own safety, then their team's, and finally the patient's. In fact, many key care providers would be expected to continue to function regardless of personal danger, even beyond the threshold of what may be considered acceptable professional risk. However, if not given priority for treatment or prophylaxis, these health care and emergency responders would likely also become casualties, and this critical resource for emergency public health would cease to exist. In this regard, these individuals should undergo triage according to a principle for preservation of a mission-critical resource. (6)

In this case, the mission-critical resource is the health care personnel and emergency responders. Although the concept of the "multiplier effect" has value, there are situations in which it does not seem appropriate. For example, patients with lethal radiation injuries often have symptoms that only appear slight initially. In addition, patients exposed to lethal biological agents may not appear critical upon presentation being triaged. The latent lethality of their condition would also make initial triage categorization inappropriate. However, much like soldiers in battle, health care and emergency responders would be needed to "return to duty" to take care of casualties from a catastrophic disaster. This becomes even more important since many of health care workers will be casualties in a catastrophic disaster.

Inherently, nurses and physicians and other health care workers will be among the casualties of a catastrophic disaster. In the dropping of the atomic bomb on Hiroshima, "fewer than 30 of 150 physicians survived; of 1780 nurses, only 126 were able to provide or assist in the medical care of the injured." (11) Laurent examined a 1984 hypothetical thermonuclear detonation in the continental United States. (11) The study concluded that there would be "one physician for every 663 patients and one nurse for every 154 patients." (11) This once again reemphasizes the concept of the "multiplier effect" for health care workers in the case of a catastrophic disaster.

Treating health care workers before other patients in a catastrophic disaster leads to several ethical questions. Diekema examined the preferential treatment of VIPs in the emergency department. (12) He points out that social value should play a role in decisions about how goods are distributed among individuals. (12) Although he does not mention health care workers specifically, Diekema does point out that "it seems reasonable to restrict preferential status in EDs only to those individuals who are so essential to the well-being of the rest of us that we all benefit from the fact that they receive the 'best' care." (12) Pledger also supports the triage of special groups. Although cited in the context of a nuclear attack, Pledger suggests that "the high priority groups might be identified before the attack and issued with some type of pass." (5) This

would allow important personnel (i.e. health care workers) to be treated before other non-mission critical individuals. However, in a catastrophic disaster, would patients falsely represent themselves as health care workers in order to obtain medical care earlier?

Although triage seems essential in a mass casualty incident to effectively sort patients, some researchers question its appropriateness. Streger points out that "between 75-80% of fatalities occur within the first 20 minutes of an event, usually before EMS contact." (1) Furthermore, "field triage is not very comprehensive and is not done under the best of circumstances." (1) Perhaps this leads one to believe that triage will do little to effect the outcome of patients in a disaster, although Pretto et al. suggest that earthquake survivors may 'die protracted deaths because of a delay in emergency care." (9) Domres et al. also questioned using triage. "We should avoid triage if at all possible" and "to stockpiles resources to have to avoid triage in the first place." (2) Considering that a mass casualty incident could occur at any time, in any community, this approach seems unfeasible. In the case of a catastrophic disaster, transportation and communication would be interrupted further limiting resources – despite the existence of stockpiles. Pledger, questions the futility of triage in a catastrophic disaster, "treating the injured would be futile and that health care workers should concentrate on the provision of water, food, and shelter to the uninjured, and the teaching of simple hygiene. (5) Leaning, concerning nuclear war, questions whether physicians should morally even consider triage in the aftermath of a catastrophic disaster.

The real debate for physicians revolves around these questions: is it the responsibility of physicians to plan for all contingencies, irrespective of the policies these plans imply? What if physicians consider these policies immoral? If, despite all efforts, the worst were to happen, what could physicians do? (13)

The triage of a massive number of casualties from a WMD or catastrophic disaster is not only daunting, but is riddled with ethical implications. Standard civilian triage practices rely upon the health care and community infrastructure being unaffected. Furthermore, health care workers could comprise a significant number of the casualties. The military's focus on "return-to-duty" and Pesik et al.'s "multiplier effect" provide possible solutions to mustering appropriate personnel resources. However, in addition to the issue of preferential treatment, other questions exist about the functionality of triage and its ethical implications. Further research and planning is needed to address the multiple issues of triage in a catastrophic disaster that creates massive numbers of casualties.

Recommendations

The triage of patients following a catastrophic disaster would be difficult. With a potential for thousands of casualties and destruction of important infrastructure, existing triage practices would be ineffective. Changes are needed to existing triage practices as they apply to WMD and catastrophic disasters while ensuring they are ethically sound.

The triage of casualties in the civilian areas should examine the military's approach to triage. In the case of a WMD attack or catastrophic disaster, many health care workers

and emergency responders will be casualties. Civilian triage should be altered to quickly "return-to-duty" mission-important personnel, such as physicians and paramedics. Much like the military's dedication to "the mission," civilian triage should adopt practices that give a similar level of attention and focus on maintaining a strong "emergency response". These aspects of military triage adopted to civilian practice should be examined to ensure they do not violate human rights. (2)

A consensus on the type of triage to be used should also be developed internationally. Domres et al. points out that this is essential to facilitate international disaster cooperation. (2)

A widely religious and culturally diverse group should participate in these discussions. A consensus should be gained on this level to allow further development of policies and procedures. This algorithm should be adopted by international organizations and sanctioned under international humanitarian law. This would encourage acceptance of moral and ethical implications of triage during a WMD or catastrophic disaster.

Disaster planning committees should begin to examine the issues of triage during catastrophic disasters. Subgroups or committees should be formed within these disaster planning committees to discuss the ethical issues surrounding triage. Local politicians, religious officials, members of the medical community, and emergency planners should discuss these issues openly. Following these frank discussions, the disaster planning committee should develop a public education plan. This plan should address important considerations for triage in a catastrophic disaster.

After triage policies are developed and endorsed, emergency responders on all levels should conduct extensive training in their use. "Clear policy and experience gained from training in triaging of mass casualties by appropriate programs could equip most providers of medical care to categorize casualties in every potential mass casualty situation, in a way that would respect the fundamental ethical principles of emergency care in disasters." (2)

Baskett concludes "there are no hard and fast answers to the ethical problems in disasters. It is an imprecise science, for each disaster is unique and each poses a different combination of ethical dilemmas." (14) As the use of WMD increases in intensity and frequency, the number of casualties and damage to infrastructure will increase. Civilian responders should continue to learn not only from their military counterparts, but from other countries. Research should continue to examine the implications of triage when confronted with thousands of casualties. Through continuous reevaluation of practices and their ethical implications, triage will continue to evolve to meet the needs of incidents creating massive numbers of casualties.

References

1. Streger MR. Prehospital triage. Emerg Med Serv 1998 Jun; 27(6): 21, 23-27.

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2. Domres B, Koch M, Manger A, Becker HD. Ethics and triage. Prehospital Disaster Med 2001 Jan-Mar; 16(1): 53-8.

3. De Lorenzo RA, Porter RS. Tactical emergency care: military and operational out-of-hospital medicine. Upper Saddle River (NJ); Brady Prentice Hall Publishers; 1999.

4. Leaning, J. Burn and blast injuries: triage in nuclear war. The Medical Implications of Nuclear War. National Academy of Sciences. (1986).

5. Pledger HG. Triage of casualties after a nuclear attack. Lancet 1986 Sep 20;2(8508): 678-9.

6. Pesik N, Keim ME, Iserson KV. Terrorism and the ethics of emergency medical care. Ann Emerg Med 2001 Jun; 37(6): 642-6.

7. Benson M, Koenig KL, Schulz CH. Disaster triage: START, then SAVE – a new method of dynamic triage for victims of a catastrophic earthquake. Prehospital Disaster Med 1996 Apr-Jun; 11(2)117-24.

8. Dolev E. Ethical issues in military medicine. Isr J Med Sci 1996 Sep; 32(9): 785-8.

9. Pretto A, Angus DC, Abrams JI, Shen B, Bissell R, Ruiz Castro VM, Sawyers R, Watoh Y, Ceciliano N, Ricci E. Analysis or prehospital mortality in an earthquake. Prehospital Disaster Med 1994 Apr-Jun; 9(2): 107-17.

10. Carter BS. Ethical concerns for physicians deployed to Operation Desert Storm. Mil Med 1994 Jan; 159 (1): 55-9.

11. Laurent CL. Disaster triage of massive casualties form thermonuclear detonation. J Emerg Nurs 1990 Jul-Aug; 16(4): 248-51.

12. Diekema DS. The preferential treatment of VIPs in the emergency department. Am J Emerg Med 1996 Mar;14(2):226-9.

13. Leaning J. Physicians, triage, and nuclear war. Lancet 1988 Jul 30;2(8605): 269-70.

14. Baskett PJ. Ethics in disaster medicine. Prehospital Disaster Med 1994 Jan-Mar; 9(1); 4-5.