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EMERGENCIES, CRISES AND DISASTERS IN HOSPITALS

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Abstract

This paper uses information from 76 participants in 13 focus groups in acute-care hospital organizations in California, Tennessee, and New York, to offer a model of rapid social change in hospitals. It finds that hospitals, to ensure health service delivery in a variety of often rapidly changing and turbulent environments, engage in constant improvement and planning, programming, and collective mindfulness of current and future troubles. Hospitals do not differentiate operationally between emergencies, crises and disasters and do not have an objective set of criteria to invoke their disaster plan, but instead rely on staff's subjective evaluations of the actual and/or potential impact of hazards and/or other occasions on their operations; the likely effects of these occasions and conditions on the hospital's ability to continue to take care for its patients optimally; the extent to which staff has confidence in its predictions; and the degree of preparedness and planning for these occasions. Community disasters are not necessarily hospital disasters, and the reverse is also the case. The implications of these findings for an institutional conceptualization of disasters are discussed.

EMERGENCIES, CRISES AND DISASTERS IN HOSPITALS

This paper examines ways in which hospitals adjust to sudden demands in their environments. However, instead of examining the medical problems associated with specific disasters, disaster drills, disaster planning principles and requirements, and extramural relations of hospitals with EMS and other emergency relevant organizations, it looks inward as it were, describing, from the perspective of hospital administrators and staff, what actually takes place inside hospitals faced with emergencies, crises, and disasters. The attempt is to identify the operational logic of these complex organizational systems faced with these types of occasions: what usually happens inside hospitals to respond to sudden changes in demands for resources, and how do these changes become part of the very structure of these complex organizations? The answer to this question, documented below, is that hospitals routinely incorporate the demands of emergencies, crises and disasters into their programs and training in a process of constant learning through which hospital units and their functions change and increase their resilience. Hospitals lack an objective set of criteria to differentiate operationally among emergencies, crises, and disasters, and instead use subjective criteria to make sense of these occasions and respond to them. Indeed, the invocation of the disaster plan and the increase in the level of response associated with disasters in the hospitals in our study are a function of the hospital staff's estimation of the actual and/or potential impact of hazards and/or other occasions on their organizations, the likely effects of these occasions and conditions on the hospital's ability to continue to take care of its patients optimally--the primary value and rhetoric justifying all other institutional processes (Fagerhaugh et al., 1987), the extent to which staff has confidence over its

predictions, the availability of staff, equipment, supplies, and other resources, and the hospitals' degree of preparedness and planning for these occasions. These are a set of factors suffused with uncertainty, for they are not linearly and monotonically related to each other but instead evince complex interactive relationships. Moreover, they are the outcome of negotiation rather than of social construction (see below).

We place these results in a broader theoretical context, suggesting the value of an institutional definition of disasters that would incorporate multiple levels of analysis---institutional, complex organizational, and socio-psychological---in the study of disaster-related social processes. Gaining a satisfactory understanding of social processes in occasions of collective stress must attend to the institutional controls and patterns impacted by previous and future hazards, the sway of opinion and the struggles of competing rhetorical descriptions and explanations of hazardous occasions, and the pressures towards conformity to expected lines of action embedded in semiotic codes used by people to orient their behavior, for a disaster associated with a given set of institutional contexts, rhetorical struggles, and criteria of relevance may not be a disaster in different contexts. The following pages present the methods used in the study, followed by the results and its conclusions.

Methods

Information used in this study comes from 13 focus groups in acute-care hospital organizations collected as part of a hospital seismic mitigation study. The population of hospitals comes from the American Hospital Association's (AHA) Guide to the Health Care Field, an annual directory of hospitals and health-related organizations in the United States, which provided basic background information for hospitals, including bed count, type of ownership, and a list of facilities within hospitals such as trauma centers and maternity

wards. Included in the study are hospitals in three regions of the United States facing different levels of seismic risk--Southern California, with a high level of risk, Tennessee, with a moderate risk of seismic activity, and the New York metropolitan area, with a low level of risk. Four criteria were used to select the hospitals. First, the hospitals were required to be acute-care facilities with emergency rooms or trauma centers. This requirement disqualified a number of specialty hospitals and clinics, including mental hospitals, children's hospitals, and Veterans' hospitals. Second, hospitals in each region were selected based on the size of the hospital organization as measured by the number of beds: hospitals with less than 150 beds were considered small; with 151 to 300 beds were considered medium-sized (there were no medium-sized health care facilities in the Tennessee study region); and those with 301 or more beds were considered large. Third, hospitals with different types of ownership were included. The final sample has three government-owned and operated facilities, three for-profit organizations, and seven nonproprietary, not-for-profit organizations. Fourth, in each of the three regions, the selected hospitals included hospitals in major metropolitan cities and in smaller cities in the same counties. The non-metropolitan facilities were thus selected to study the impact of city ordinances and building codes on hospital mitigation measures, as well as the effect that hospital networks and health care associations have on risk perception and preparedness.

Twenty-nine health care facilities satisfied these selection criteria and were asked to participate in the study. Thirteen participated: four out of six in California, five out of seven in Tennessee, and four out of 16 in New York, in which a very large proportion of large hospitals declined to participate. It is not known why some of the hospitals decided not to participate. The primary reason seem to have been lack of time of the staff caused in part by

their need to prepare for surveys from the Joint Commission on Accreditation of Health Care Organizations (JCAHO). Whether for this or other reasons, their lack of participation rendered the findings of this study unrepresentative of the population of hospitals in the three regions, and should only be understood as preliminary and in need of replication using a more representative sample of hospitals. This is the case even though the present study is the most complete analysis of the hospital-disaster link available to date, providing a foundation for understanding disaster mitigation in these settings.

The 13 focus groups included 76 respondents and at least one representative from each of the following four groups of staff dealing with crises and disasters: hospital administration, physicians, nursing, and engineers. Respondents represented a diverse range of professions. Several of the focus groups included high-ranking members of hospital administrations. Most were active members of their hospitals' safety committees and had been involved in safety issues and crisis preparedness policies, embracing continuous quality improvement. This selectivity should be kept in mind in the interpretation of the results. The respondents are not a random sample of hospital staffs but have a strong interest on preparedness and mitigation activities that is probably not shared by all hospital staff. Nevertheless, they are ideally situated to comment on disaster-related patterns of organizational life of interest to us (Table 1 around here).

The focus group interviews consisted of open ended questions on hospital experiences and perceptions of internal and external risks, emergency plans and programs, the importance for emergency response of operational units in the hospitals, the functioning of internal physical systems such as heating and external lifeline systems such as transportation routes, and various emergency preparedness measures. The content analysis

of the texts of the focus group responses was guided by both deductive and inductive logic. Inductively, repeated analyses of the texts allowed us to extract from them recurrent codes or themes. We also derived codes to organize the texts deductively from the literature on high reliability organizations and closed systems (Morgan, 1986; Johnson, 1976). The cultural dimensions identified in the analysis presented below satisfied the criterion of repeatability, for they appeared in most if not all of the transcripts. The quotes are numbered to link them to the specific transcripts from which they are taken. They are slightly edited when needed to shorten them, remove repetitive phrases and improve their readability. To simplify the presentation of the results of the study, statements of different respondents in a focus group that amplified and or gave examples of the same subject matter are presented as one quote, although the original meaning is preserved. The names of respondents, hospitals, and their locations are not included.

A multiple constant comparative method was used to ascertain the scientific validity of the findings (Lincoln & Guba, 1985, p. 339). From each of the focus group interviews we compared incidents applicable to analytical categories and then integrated categories and their properties, delimiting them so as to increase their inclusiveness. The strategy involved creating categories that could accommodate the bits of information collected in the interviews, as well as creating generalizations that were valid for them. In the present case, we attempted to understand the way hospitals change and adjust to the demands of emergencies, crises, and disasters.

Results

Reliability. Hospitals have a number of characteristics of high reliability organizations (Mallak, 1998); they are stressful, fast-paced settings nowadays operating

at near full capacity (Gardner, 2001), where surprising things happen fast and demand appropriate responses that involve coordinating diverse subunits and individual actors (Chambliss, 1996). They have a dominant rhetorical justification for their actions, a commitment to a common purpose that is normative and is assumed to be collectively held by everyone in the organization, namely providing optimal health care to patients. While egregious errors take place in hospitals and are the cause of the patient safety movement sweeping the United States--close to 7000 people die each year as a result of medication errors, and various efforts such as voluntary reporting are now being instituted (Margaret Oleary, personal correspondence, July 31, 2003)--in this study the focus is not on the clinical aspects of hospitals but on the socio-technical safety, planning, and engineering of the physical plant subsystems; our respondents were concerned with providing the continuity of resources of energy, space, and material that the medical staff would need to treat patients. They practice redundancy, constant improvement, planning, and programming, as well as collective mindfulness of current and future troubles (Weick et al., 1999; Weick, 1987; Roberts, 1990; Rochlin, 1989).

Committees. All of the hospitals in our study have large safety committees (American Hospital Association, 1972). These committees not only develop policies and programs but also participate in the constant evaluation of systems. Typically an event takes place or a problem is identified of relevance to the safety of the organization. A task force composed of representatives from a number of departments is formed to study it and report their conclusions to the larger committee. This centralized monitoring function is important in hospitals and accounts in part for their resilience and gradual strengthening over time. Below is a typical case,

"Our emergency preparedness committee is a vast, diverse group. We have tried to get a representative from just about every walk of life within the hospital so that we don't get tunnel vision. Eighteen people were assigned at the beginning of this year, and we usually have at least twelve people show up. We meet once a month outside of the drills and we meet when we have our drills, and then we have a special meeting for it. People on the committee actually go to the key areas. There are four areas, and we evaluate the process and how it flows. The evaluations are all brought back together and we summarize them, put them together, and then report back to the directors at the department directors' meeting, which has all the directors in the hospital, so there is the opportunity to discuss the things that need to be fixed. It is a wide-open group, with many different concerns and expertise. We have three, four vice presidents so that there is also diversity at the top level."6

Redundancy. An intrinsic part of the continuous strengthening of the social organization of hospitals is the constant checking for the reliability of mechanical and electrical systems and the redundancy that is built in all of the utilities and other key dimensions of their physical plants. A dominant theme in hospital culture and a recurrent response of our informants to our questions is the anticipation of trouble, and the attempt partly through redundancy, partly through programs, planning, and training to solve the trouble before it happens. Redundancy is often engineered into the design of the physical plants themselves; it often comes about through the provision of linkages to systems outside the physical plants that can be deployed quickly to provide emergency supplies. The following example is typical of the arrangements in the hospitals in this study, showing both a sense of anticipation of trouble and a multiplicity of ways to handle it,

"We have put sprinklers and smoke detectors in the entire hospital, which obviously cuts down on any of your risk of fire and smoke. We have a very active fire brigade training program that operates on all shifts to respond to any fire and smoke emissions. In addition, the hospital also installed an emergency generator that is literally large enough to power almost 100% of the needs of the hospital. We are fairly self-sufficient in providing emergency power to those life support systems including the elevators and the medical gas systems. We have arranged various other systems or utility systems coming into the hospital. For example, a steam generator will be placed on the street in order to provide the hospital with emergency steam, and that fitting is part of the system. We also have alternative sources of water, which can be tied very easily into feeding the hospital's water system. We have invested a little money in the infrastructure of flood response or surge back up response, and a number of contractors are available 24 hours a day, 7 days a week. In addition there is the city fire company right across the street, they can take their truck and pump it right into the hospital system. On the electric, even if the hospital's emergency generator failed, we can take in another emergency generator on the street and tie it right into the electric system of the hospital."13

Redundancy is engineered into the very structure of the physical plants of some of these hospitals as they are built. In one of the hospitals, several feeds of external wiring were placed around the perimeter of the entire complex of new buildings, which meant that there were, "6000 additional lines available, emergency power, protected with the latest fire alarm and fire protection system. Rather than having a central plant for generation that could fail, we have distributed power, so all of the buildings have their own emergency power source."8 In the same hospital, they had different telephone PBX controls in the buildings,

gas-operated fire suppression equipment in the computer areas, and halon-gas fire extinguishers in key areas such as the oncology treatment area. They also built dike systems around their fuel tanks and moved them to the central parking area to minimize the impact of an accidental explosion, as well as extensive agreements with outside firms to provide the hospitals with oxygen, blood, and other critical supplies in case of an emergency.

Similar levels of redundancy exist in the other hospitals in the sample. It is not that all present and future problems are fixed in the hospitals we surveyed, but that there is among hospital managers and administrators an attitude of vigilance and a constant mindfulness of the potential weaknesses of their critical systems and the need to provide alternatives if they were to fail.

Vigilance. In another hospital, they have elaborate written directives as to what do to in case of disasters and computer programs teaching people what to do, but the person in charge was still unhappy because she felt that the staff was not taking the material seriously, so the "right information was not getting to the right people" 5. There are other examples in the record of this sense of vigilance and questioning of existing arrangements, and the fear that what exists is not good enough. A recurrent fear is that hospital staffs do not know what they are supposed to do at time of crises, that many employees forget the meaning of various disaster codes and what they are supposed to do if they are activated. As a respondent from a hospital puts it,

"It is not that people are not exposed to the information, it's their retention of it. Many times from a safety issue you are throwing a lot of stuff out there, you know, "this is fire, this is evacuation, this is disaster, this is bomb threat, this is hazardous material." Which of those things are they going to retain? I think as a facility that is certainly one of

our challenges, to look at how we can do a better job educating the staff in those regards, what strategies will be most effective."6

In turn, various approaches are considered to handle the problem, from paper and pencil to computer based programs, to training exercises, to changing the color of the manuals: in one hospital they put their safety manual in a red binder and distributed to all of the departments to help them locate the manual more easily in times of crisis.

Not only there is constant monitoring and feedback in the hospitals in the study, but there is also the enactment of corrective measures when needed. For example, in one of the hospitals there is redundancy in many of the critical systems as well as the awareness among key staff members that their in-house emergency water supply is insufficient, paired with ongoing efforts to arrange solutions with agencies outside the hospital: "I have a plan for the National Guard to come furnish us water in trailers. We (also) have an agreement with the local brewery. They use water, and they will bring us water in a major emergency."5 In this same hospital there is the awareness of yet another problem that is not fully resolved to the satisfaction of the respondent, namely the lack of communication with staff and doctors immediately after a disaster would impact the hospital. Various options are being contemplated to ameliorate the problem, from adding runners to providing portable telephones, which show imaginative planning before the occasion based on the realization that things are vulnerable and need to be strengthened.

The aforementioned characteristics of safety, preparedness, and mitigation measures in hospitals--anticipation of trouble, vigilance, redundancy, feedback and correction-- in their totality represent an important technology bringing about organizational adjustment in hospitals that has important implications for the way emergencies, crises and disasters in

hospitals are understood and incorporated into programs. The different requirements generated by these three types of disruptions eventually become routine programs and practices in hospitals that are then applied to a whole range of occasions, thus blurring the distinctions among them.

Emergencies, Crises and Disasters. There are important differences among emergencies, crises, and disasters that are often unappreciated (Garber et al., 1978). Hospitals are in the business of emergencies, defined as "situations requiring applications of the organization's existing policies and procedures" (Borodzicz and van Haperen, 2002, 139). Crises on the other hand involve organizational responses to occasions that are perceived as important and that must be done in a hurry. They are to some extent unplanned and unanticipated (Elling and Halebsky, 1961, p. 64), create demands for services outside existing policies and procedures, and require from organizational staff creativity, innovativeness, and adaptation.

By way of contrast, disasters can be thought of as special crises brought about by both realized and possible hazards and varying in a number of dimensions (Tierney et al, 2001)--among them their relative suddenness, length of forewarning, magnitude and duration of impact--that exceed the resources and other response capabilities of the organizations. For the purpose of this study disasters are understood as extreme crises in which the continued existence and functionality of the hospitals is in doubt. In some cases, disasters impact directly the hospitals in a community and they become victims. They experience widespread destruction of their facilities and other resources that makes it impossible for them to continue to operate in the customary fashion, or that dramatically curtail their operations and services (Webb, 2000; Whitney et al., 2001). Fortunately

however, this is not what customarily happens, and in disasters hospitals continue to function as responding organizations.

From the perspective of hospital staffs most of the time disasters are definitions of situations constructed elsewhere. Disasters directly impacting hospitals in our study are so rare that one respondent associates them with the "Oh Shit" response:

"Question: What type of an event has to occur in order for the hospital to activate its disaster plan? Well, let me give you my Martha line. Martha was an emergency preparedness nurse and she said that the question is always, when do you institute a disaster plan? When do you know it is time to push the button and change the way you do business? She played a couple of tapes, and one of them is an ambulance going to the hospital during the earthquake and you hear the siren, the guy is talking to this guy who is having a heart attack, going up over the top of the hill, and he gets to the top of the hill and sees that the hospital is laying on its side and he goes "oh shit" and that theme comes over; she says when you see a situation and that is the first word out of your mouth, that's when you do it. And that is what I do. I ask is it a situation that provokes that kind of emotion in me?"7

The invocation of the disaster plan in hospitals is a subjective decision very much impacted by the fact that emergency planning and preparation in hospitals incorporates the real and imagined demands of crises and disasters into their emergency procedures. Hospitals try to anticipate these demands by making them part of their standard operations. Planned hospital evacuations provide an illustration of how disaster demands are incorporated into the operations of the hospitals through planning and imaginative construction of future calamities that may directly impact the hospitals. Almost all hospitals in the sample had plans and arrangements in place for evacuating their facilities to other

buildings in the community in the aftermath of disasters that would destroy their ability to continue providing service. Here is an example of planning in the making,

"I would like to go to Herman Hospital at some point and talk to the people that were involved in the evacuation, and how they accomplished it. I understand they had to evacuate the whole hospital for the flooding. I cannot imagine evacuating 500 patients because there's not a hospital in town with the bed capacity for us to evacuate to, because we all stay full and on diversion half the time. In one scenario, a hospital right across the street from us did a fake evacuation to us and actually we received them in our women's hospital, and learned things like they had to bring their own oxygen outlets, because our oxygen connectors were different than theirs. We have never evacuated to another hospital, never put that scenario together."5

Here is another already in place,

"We have an evacuation plan, and a discharge criteria plan, you know, step-by-step who can go where. We also have this sister hospital that, on any given day can probably discharge 100% of their patients and then absorb some of ours. We have an agreement with a local college and with the city Church. And we've identified some alternative buildings."6

Even though at times hospitals are directly impacted by hazards, the aforementioned established organizational adjustment in hospitals—vigilance, redundancy, work of safety committees-- blurs the distinctions among emergency, crisis, and disasters (compare to the functionalist view of disaster, in Tierney et al., 2001, 9). In practical terms, despite their conceptual distinctiveness, the differences between emergencies, crises and disasters do not make sense to hospital staff, for the solutions to the demands on the hospitals that these occasions create are made part of the very structure of the social organizations of hospitals

through a constant process of safety monitoring, anticipatory corrections, and risk mitigation. The space and time dimensions of these types of occasions are not chronological and physical as much as they are socially linked to the institutional calendar and its built environment. Rather than disasters, usually subunits in hospitals experience crises, occasions that interrupt or threaten to interrupt their planned and expected operational procedures and their ability to function at some agreed levels of efficiency, and resources are mobilized to ameliorate the effects of the crisis. Even in the documented cases in which hospitals are impacted and disaster situations ensue and disrupt hospital operations (see for example Editor, 2001; Organización Panamericana de la Salud, 2002; Tanaka et al., 1998; Chavez and Binder, 1996; Peters, 1996; Roskelley, 1994; Siwicki, 1992), they typically exhibit extraordinary resilience.

As a result of crises and mostly external disasters, adaptation and organizational learning takes place in hospitals (Caulkin, 1998, 46). Crises and disasters in hospitals do not have to occur to become the subject of intense planning and programming: future crises and disasters, either more or less similar to previous occasions, or never-before experienced but anticipated occasions, become part of the imagined reality of hospital staff, are considered as having the potential to occur and disrupt the functionality of the hospital, and anticipatory planning and corrective actions take place to respond to them (5). The planning and mitigation that take place is part of a general culture of mindfulness, a deep-seated awareness that emergencies and accidents are always lurking under the appearance of utter normality, so that crises and disasters, either occurring or imagined, are used by hospital staff as signals of impending trouble which demand their response (Slovic, 2000; Renn et al., 1992), in what Kates (1985) refers to as the "institutionalization of hazards

management." In the words of one of our respondents, "There's always the unexpected. It is just a scary thought, because you never know what you're going to run into, and what you thought was going to work doesn't work. But as far as actually looking at it and being prepared I would guess we are doing that."2

In sum, based on the procedures of the hospitals in our study, the disasters that take place usually occur outside the hospitals but are not disasters for hospitals: they are experienced by hospitals as emergencies or crises to which they respond by providing health-care related services; they are often the impetus for hospitals to plan, program, train, and coordinate with other health service providers and institutions in the community. Hospitals try to incorporate the imagined or real demands generated by these occasions in their emergency and safety programs, and the overall process and systemic feedback relationships that exist among emergencies, crises, disasters, and institutional strengthening in hospitals can be understood as the routinization (Stallings, 1998) of these processes in these hospitals, resulting in the increased resilience and reliability of these complex organizations. When and where they take place are social attributes of these organizations.

Not a normal day. Because they do not differentiate among emergencies, crises, and disasters but treat them as sources of demands bringing about institutional change and adaptation, a number of our respondents also rejected the notion that they could describe "a normal day in the hospital." This finding reaffirms the claim of scholars that have documented that hospitals are organizations where abnormality is normal (Chambliss, 1996; Sudnow, 1967; Strauss et al., 1963; Huge, 1958, p. 88), and where the ability to satisfy to a sufficient extent the daily demands of the organization is seen as an achievement in itself.

Some of our respondents' comments reflect this reality,

"There is nothing normal in a hospital situation. It changes from day to day, season to season, month by month and also it depends on what is happening in the community around you. So I think what is normal for one hospital is not normal for another hospital."9

"I think the idea of a normal day is kind of a joke. It is a normal day if we get enough people to show up to work to be able to take care of the patients."6

"Do you subscribe to Chaos Theory? From a staffing perspective we track patients, both in-patient and out-patient volumes, and we staff for that type of volume and try and use some variation or calculation of what we think we need on top of that, but given the shortages that there are with nurses, quite often we are fortunate if we can just manage to cover those patients that are in the hospital. Then it becomes a chess game all day long trying to re-position people, re-position patients, and whatever else, in order to keep things functional. It is the unknown that creates problems; so everyday is somewhat of a disaster preparedness drill. We are doing it on a daily basis, looking at it from shift to shift."7

While the above-made claims about the unpredictability of hospital processes cannot be literally true, for otherwise there would be no blueprint for behavior and interaction, the inability of our respondents to describe a normal day at the hospital is due in part to the hospitals' vulnerabilities to occasions for which they have no control. It is not solely a matter of lack of nurses. Many extraordinary situations in the focus group transcripts illustrate that hospitals are not normal places. Admittedly two extraordinary incidents we uncovered was a bomb brought into the hospital by a law enforcement unit and a fire in an underground community that had serious consequences for the hospital. In the first instance,

"Someone showed up at the ER with a bomb, which was a real disaster. We called the bomb squad out. He did not bring the bomb to blow us up; he accidentally brought the

bomb with him. He almost blew himself up. He was at a mescaline lab in the back of a truck and was building the bomb in case someone came to raid it, and as he was building it he blew his hand off. And the ATF brought him and the bomb to the hospital. It was quite a day. That same day we also had a fire in the elevator, and then we also had a patient with a gun."6

In the second instance,

"A couple of homeless people had a disagreement under a viaduct approximately 10, 15 blocks from the hospital. One of them set the things of the other one on fire, so it got a little out of control under this viaduct, a whole colony of homeless people in it, and the fire set by the mattress burned through what was supposed to be better protected cables. We were quickly without phone service of any type. They ran some phone lines into us but it took three or four days before we had full service--the police department set up a temporary headquarters truck on the street outside, and they coordinated calls."9

In the same hospital (9), a third episode again shows that many of the vulnerabilities of hospitals are often created outside of the hospitals in ways that cannot be anticipated: strong winds blew dense smoke from a major fire to the hospital building, and the smoke was then sucked in by the air conditioners, so that many patients and staff began to complain about respiratory discomfort, with some receiving treatment in the emergency room until the situation was corrected.

The Elusive Disaster Plan. Just as our respondents were not able to describe a normal day or to separate emergencies, crises and disasters in their practice, they could not specify the occasions that would trigger their disaster plan (American Hospital Association, 1966; Auf der Heide, 2000). Activating a disaster plan is contingent and situational rather

than programmatic or easily codified. Of course, all of the institutions in our study have emergency plans that specify a certain number of incoming patients as a trigger to the plan (Brown, 1979). However, while the number of people injured is part of the written plan, in fact that is not the way it works (on the matter of hospital disaster plans and their lack of enforcement see Taylor, 1974). A recurrent theme in the discussion of hospital administrators and managers participating in the focus groups is that there are no specific trigger occasions or specific sets of conditions that bring about the implementation of the hospital disaster plan. Instead, the decision to put into effect the disaster plan is based in part on the history of the institution with previous occasions of its types as well as being an outcome of ongoing interaction and negotiation, rife with uncertainty, for what is a disaster depends on calculations by hospital staffs of the known or surmised demands created by types of occasions, as these demands are interpreted in light of existing or potential capabilities of their institutions to deliver care.

There are many examples of the importance of social time and social space in the construction of disasters in the focus group records,

"It is really subjective. If there are more patients that are going to be coming into the ER than what the current staffing is at that moment and they cannot handle them, they will call the code D dispatch to get more staff to that area. Say the clinical manager in the ER has 27 patients in there, and all of a sudden you add a bus crash of twenty people, they would probably go ahead and notify the administrator on call, which would activate the plan if he deemed it necessary. But again, there are a lot of factors that have to be taken into account such as our current status of staffing, current number of patients; availability of equipment versus what is coming in."8

"What triggers the plan is really a judgment call as to when we need additional help, and when the demand for services is beyond the scope of what we can do within this facility. In the daytime, we could mobilize and respond, because we have staff here that can help: even if we get a large number of mass casualties in the emergency department we don't necessarily go to our condition blue which is our full disaster plan. We have handled bus accidents with 30 or 40 kids and never implemented the disaster plan because I could get the pediatricians, the nurses, and the social services support staff already here. Instead, it becomes sort of a disaster alert without activating the whole plan. But at two o'clock in the morning, we might respond totally differently."9

Yet a respondent from a third focus group indicates that the decision to implement the hospital disaster plan cannot be easily quantified, for the response is tied to the resources that are available and to calculations of the demands that must be satisfied,

"I do not think that a certain influx number triggers the plan. Our plan is not triggered by number of patients, because ER volumes do increase and decrease but the variation is not related to any disaster but it can happen due to the normal demands of the population here in the city. What we rely upon is the available resources, so that if the emergency department feels that its resources are stretched, either from a physician perspective or a nurse perspective, then the house supervisor, and I am talking about off-shifts--because if it is during the day we can get the help we need--is made aware that the resources are now strained and may need to invoke the plan. Our response is to basically look at our resources, and then we decide if they are being strained and if the demands will be increasing, and then the administrators will make the decision to have a disaster situation. Five years ago an ice storm hit the city and several hospitals had to go into disaster mode to

accommodate nursing homes that had lost power, so those kinds of external issues are involved."6

Calculations about the likelihood or potential for increases in the demands for the services of the hospitals generated by incidents are important predictors of the invocation of the disaster plans. At times the calculation fails. Thus, in one instance, the hospital implemented the disaster plan because a tornado had impacted a nearby community, under the assumption that they would be having an influx of patients. However, they "wound up getting one person out of the deal. So, it is a potential, and if it is high enough we go on into our emergency plan."5

The decisions of hospital staffs as to whether or not to enact disaster plans are very often marked by high levels of uncertainty about the health service demands that may materialize. In the words of respondents in two of the focus groups,

"I do not think it is actually a certain size. The first level would be a trauma call, say if there has been a big wreck. At that point in time we usually do not have a clue as to injuries. And in fact just a few years ago we had a train derailment right across the street. A locomotive fell right off the railroad tracks. When that happened, we went on a disaster alert, because we did not have a clue what the train had, if there was anybody in it or if it was just a freight train, or how it would affect the community, whether it was carrying chemical."4

"It depends on the situation. Sometimes a plane crash will only have five casualties versus 25 from a traffic accident. We get the call in through our EMS Dispatch. They notify us if it is a large incident and advise the administrator on call, who will make the decision as to whether or not to activate the disaster plan."8

A key concern is having sufficient numbers and types of medical specialties and other staff, "Whenever we go into a disaster mode we automatically keep staff, we make sure that there are personnel available. Sometimes people are prevented from reporting to work, so we keep people on until the next shift. Secondary to that, there are some people in the staff who have not slept, so we make provisions for them to sleep."2 The activation of the disaster plan in two of the hospitals in the study is also impacted not only by calculations of likely health service demands, available resources, and uncertainty regarding the future, but also by financial considerations as well as by the reluctance to engage in system-wide procedures that are rarely implemented. In one of the hospitals, part of the reluctance to activate the disaster plan is that it is very elaborate and thus costly to put in place,

"Our standard definition of disaster is anytime that we have an influx that we cannot handle it. A Code Blue situation is a separate and distinct policy. Use of a Code Blue can only be called by the CEO or his designate, and there are various components of the plan, everything from attending physicians being called in from home, to routine staff going to a centralized personnel pool for further dispatch areas as needed. So it is quite a sophisticated system. The plan has a lot of dominoes that kick into effect, such as special numbers for family to call and to check on their loved ones."9

In another hospital the reluctance to enact the disaster plan was also associated with the relative infrequency of the associated procedures, "We try our best not to implement the disaster plan because things run best when people are used to working together, used to the equipment. It works better when they know the system. We try not to go to go a system that we use only once or twice a year doing a drill."9

Importantly for our understanding of disasters is the absence from these findings of the view that the invocation of the disaster plan by the hospitals is determined by the occurrence of a disaster in the community. Instead, what triggers the plan is very much tied to the internal dynamics of the hospitals and to the dominant institutional value of maximizing patient welfare, a criterion that is basic to understanding how hospitals process emergencies, crises, and disasters. Disasters are not just global occasions impacting regions and communities but also have institutional boundaries.

Indeterminate Occasions

Yet another finding supporting this interpretation of the fluid nature of the distinctions between emergencies, crises, and disasters is that it is not always possible to predict that incidents with given characteristics will be commonly understood as either emergencies, a crises, or disasters.

Emergencies. Traffic accidents involving multiple victims are one of the most common emergencies that occur in the hospitals in the study. Sometimes they are handled routinely; sometimes they bring about the invocation of the disaster plan. While the medical aspects of these mass injury emergencies are handled routinely, often the number of family members and friends that converge on the hospitals cause problems that force hospitals to adjust and plan, as the following case illustrates: "when people start streaming in we impose security controls to external and internal traffic patterns, and we do have designated places where we put people; we do not want everyone running down to the ER or the intensive care unit, so especially with bus accidents; we have become experts on where to put parents and where to put kids when we finish treating them, and so on, just putting people where they need to be."9

Below are three examples of "routine" emergency events:

"We are used to getting a few motor vehicle accidents, five or six patients that are not critical but moderately injured all at once. It is the typical kind of thing. It does not really taxes us out of the ordinary. Whether it is a crisis depends on the level of seriousness of the incident. Last year the local school had somebody release a tear gas or mace canister, and they had thirty students injured. They all came here. It was localized, they weren't critical, and it was handled. It did not go up the line to the other three hospitals in our system. It was within our scope. One the other hand, if that was a school bus accident with thirty critical kids, we would never be able to handle it. So the activation of the plan is on a case-by-case basis."2

"We had a tanker explosion, a gas tanker turned over and exploded on the interstate and the gas was in the air and it caused all the cars on the expressway to stop, because it overloaded their carburetors. We wounded up having about twenty victims that night, including several fatalities out there. It was unexpected, but we dealt with it, we got all of them."5

"Recently we had a case of a city bus that was escorted here by the city police department. It was full of patients from a bombing. We have had at least a half of dozen cases involving buses. They usually come with 30 or 40 patients at a time, most with minor injuries."9

However, a similar emergency in another hospital in the study brought about the invocation of the disaster plan,

"The disaster plan is activated when there are five or more critical cases, or when there is an influx of patients that is going to tax our ability to deliver normal care to other

patients. An example will be the thirty kids that came in and overwhelmed the pediatric emergency department; they could not do regular care."2

In yet a second incident, the disaster plan was scaled down as the true magnitude of the demands became clearer. The emergency was handled under semi-normal staff conditions, for the "disaster" never materialized,

"It was a bus accident with about 50 to 60 college aged students, with unknown injuries. Our ER received a call from the EMA warning that we were in relatively close proximity to the accident and we might receive a large influx of patients. We mobilized some of our ER team, to see what was going on and determine if we needed to mobilize more people. It was a Saturday morning, about 10 o'clock or so. The influx of patients never did occur, so we did not go into a Disaster 2 mode and bring in more people. Instead, we let several folks go after things quieted down. It was a good test of the system, though there was nothing to do."6

Crises. Normal community events, for example the visits of dignitaries, often interrupt hospital activities and require extra preparations (8). Snowstorms and the flu season are also recurrent interruptions for hospitals. A sudden influx of patients during the flu season creates a serious demand for services in the hospitals: "Another disaster that happens is, once a year, the thing called the flu season; during it we have a shortage of staff and an influx of patients."1 Other respondents add:

"The unexpected, strong flu season we had two years ago was a big crisis. Every hospital in the city was overwhelmed. Downstairs there were twenty patients waiting for admission. Every hospital around us had between twenty and sixty patients waiting. For a two-month period we didn't have enough beds for those patients. And we had to actually

solve all the things that go with more patients, such as additional food, additional linen, additional nurses, all the usual services, just amplified."2

As with the flu season, snowstorms provide another example of an interruption in organizational activities for the hospital that may not be noticed in the community.

"Snow is our worst nightmare. During the storm we keep staff on tours, depending on how bad the storm is. Three or four years ago we had 36 inches of snow. We made sure everyone was working, if they were not working, they were sleeping, if they were not sleeping, we fed them. People love to get fed when there is a disaster (laughter). We got sandwiches coming out of food service. Fortunately we have an outside vendor who is extremely cooperative. Next door is a medical facility and if we need something they will also help us. We make sure that everybody has what he or she needs to get by."4

External events are not the sole triggers of disaster plans. Internal crises at time bring about their enactment. In this context floods and electrical malfunctions are recurrent crises,

"The disaster plan could be enacted due to a flood, or it could be from the telephone and the power going out. If the phones go down then we lose our computers also. So it does not have to be an earthquake or a fire in one area. It can be something internal like the flood that hit us: it impacted just one area of the hospital where the lab was, but the lab affects the whole hospital and especially the emergency room."1

In another example of an internal crisis caused by a flood, pipes in one of the drain systems backed up and flooded the corridors outside the emergency room, forcing the hospital to divert patients to other hospitals for four hours (12). In yet a third incident, a major flooding took place where one of the key electric transformers was located. The transformer burned

out, and the impact of the resulting power failure cascaded throughout the hospital, taking out air-conditioning units, elevators, and computer services,

"During the flood, when the power went out it literally shut down all power to the main laboratory. They had excessive heat in the pediatric area, and fans were provided to cool down the areas while we moved patients. The blood bank was out. This was not a small flood. There were several thousand gallons of water. So for all practical reasons this was an internal disaster where there was some moving of patients to other wings."1

In the same hospital, during construction of a maternal health center, the main oxygen line was accidentally punctured, requiring "a lot of back feeding, call in extra staff to provide cylinders, gas cylinders, oxygen cylinders, it was six to eight hours before it was fixed."1 In yet another hospital someone accidentally cut an electric cable and a power outage ensued, temporarily challenging the routine functionality of the hospital.5

There are also near misses: "We avoided a disaster last, two years ago. One of our boilers went down, and it was cold, and if the second one had gone down, then we would definitely have been in a problem. Fortunately it was just a fuse."2

Crises and Systems. Internal emergencies and crises in hospitals that precipitate the invocation of the disaster plan also come about from their interdependence with other health service organizations. This is one of the Janus-like qualities of hospitals: they are highly autonomous and self referential and they are also very much parts of inter-organizational systems; they change and orient their actions to accommodate to the demands of these systems of cooperating agencies. One hospital typifies this context quite well,

"We are one of the general hospitals in the region and we coordinate through the fire department...we are part of the municipal hospital system...in a major disaster the city's

disaster management office would either contact us directly, or, more likely contact health and hospital central office directly which would then reach out to the individual command centers. So there is an incident command system of local government agencies that reaches out to the hospital association and then it filters down to us. We are not a trauma center, so we would actually get less critical cases depending on the nature of the event; part of our big role is to support our network partner and take the more minor cases that we can handle and let them as a trauma center get some of the critical cases."2

The importance of these systemic linkages of hospitals to other community organizations, particularly health service organizations, is that it is often the way in which emergencies and crises are created in hospitals and solutions to emergencies and crises found for hospitals. The experience of two hospitals illustrate the crisis-creation process,

"One episode that happened three years ago was the unexpected closing within a day of the nursing home. They had several hundred patients and they all came here. They closed and soon after we had, how many, twenty or thirty patients. Suddenly we were told, "you're getting this amount of patients." It was really a limited emergency situation, for we had to attend to the very specific needs of those patients."2

"A few years ago, it was a real bad ice storm. The roof of the nursing home fell in, and they had to evacuate the nursing home patients and bring them here. I think there were 70 to a hundred patients that night."8

The experience of another hospital illustrates the emergency and crisis-solution process, "We have a partnership, letters of agreement, with six or seven nursing homes in the community, so that if we need to discharge people out we can get them out to them to make vacancies available for us, and if they have a situation, they can ship them to us."4

At times the demands generated by the system never materialize. Nevertheless, system-originated emergencies and crisis in hospitals that create disaster conditions may take place purely on anticipatory grounds as a result of the hospital's connectedness with other hospitals and community organizations. The 9/11 WTC attack illustrates this point,

"The last activation of the disaster plan was actually September 11th. It was a decision that was made by our network partner, based on TV and the knowledge that the buildings had collapsed. The anticipation was that we would get many patients. In the end, we didn't have that great an influx of patients. They only transferred eleven patients who were waiting for ICU beds so that their ICU would be available to the critical cases that were assumed to be coming from the WTC. So immediately, literally within thirty minutes, disaster plans were underway for transferring patients out of their emergency department to our emergency department, and our disaster plan was activated so additional equipment and staff were brought in or notified. For the World Trade Center incident, we actually set up a secondary triage area on the second floor in our ambulatory care area in the medicine department, in the event that there was an overflow from the emergency room. It was done anticipating that the patient flow would overwhelm us. (Instead), during the WTC incident we had a tremendous influx of people coming in for mental health intervention; they needed somebody to talk to about the situation."2

From the foregoing material it is possible to identify inductively what is involved in the invocation of the disaster plan and the increase in the level of severity of emergencies in the hospitals in our study. The invocation of the plan is a function of the hospital staff's estimation of:

1. The actual and/or potential impact of hazards on their organizations,

2. Availability of staff, equipment, and supplies,

3. Hospitals' degree of preparedness and planning for these occasions

4. The likely effects of these occasions and conditions on the hospital's ability to continue to take care of its patients optimally, the primary value and rhetoric justifying all other institutional processes,

5. The extent to which staff has confidence over its predictions,

These are the main dimensions implicated in the activation of the disaster plan in hospitals, and as shown, they are not related linearly to each other but instead evince complex interactive relationships, with the effect of any one of these factors depending on the specific ways that the others occur (compare to Reynolds and Wright, 1976). In sum, challenge to the functionality of hospitals are of two broad types: supply disruptions, or the loss or diminution of resources needed for the organization to function as an organization, and demand disruptions, or an increase in patients, actual or anticipated, in excess of existing capacity; the invocation of the disaster plan is a complex outcome of these two processes (compare to Haas and Drabek, 1970; Mileti, Drabek and Haas, 1975). Hospitals are seldom the victims of community disasters because the simultaneous occurrence of both types of supply and demand disruptions is rare.

To summarize, crises are occasions whose effects are unplanned and unexpected and that disrupt hospitals' operating procedures. A crisis may occur in a hospital that is not noticed in the community. Similarly, disasters occur in communities that are not disasters for hospitals. The claim that a disastrous occasion is taking place most often comes from outside the institution of the hospital, but the response to that claim is very much dictated by processes internal to the hospital. There is no necessary correspondence between hospital

and community claims. The distinction between the two types of claims is amplified by the relative autonomy of hospitals and their emphasis on reliability as well as by the fact that, contrary to most other community organizations, hospitals are in the business of providing normal responses to extraordinary occasions, absorbing abnormal occasions and processing them to try to alleviate and improve people's health.

As an example of technology, disaster plans are cultural rather than nonsocial or physical elements of the organizations of hospitals. The activation of a disaster plan is not the same as the occurrence of a disaster in a hospital. The plan is often activated as part of the normal abnormality of the place. It is not that procedures in the hospital become unmanageable but that ensuring their continuation is thought to require special attention and care, that in the perception of hospital personnel demands on their services are increasing or may increase, also often simultaneously coinciding with their perception that existing institutional capacities are or will be degraded and thus must be strengthened. It is in this frame of mind of anticipating trouble in conditions of uncertainty that compensatory arrangements are made. The analytic distinction between hospitals' internal emergencies and external community disasters is useful if it is understood that there are feedback mechanisms between the two, and that community disasters at times impact the social organization of hospitals and make them more resilient, increasing their ability to handle emergencies; a good example of this was a heat wave that became a community disaster and that was the impetus for the establishment of a community public health network in which the hospital committee was a key part (4). At the most abstract level, hospitals have their own time and space attributes that determine how they respond to emergencies, crises, and disasters.

Conclusion

The preceding pages have documented how hospitals adapt to emergencies, crises and disasters in contexts of chronic uncertainties, and how the demands produced by these

occasions are incorporated into the very social organization of hospitals in an ongoing process of institutional strengthening. They also document the usefulness of differentiating among the micro, meso, and macro levels of analysis in the study of hospitals and disasters, in this case, the experience of respondents and departments in hospitals, the hospitals as complex organizations, and the communities, respectively. These findings also have implications for our understanding of disasters.

They enhance present day understanding of disaster in two directions. First, they highlight how disasters are socially constructed within an organizational logic, as a set of social occasions distinct from the magnitude of impact of a particular disastrous occasion. Rare in the disaster literature key informants directly tell us how they construct disaster and show us how this construction is shaped by how their collective life is organized, which in this case is more along the lines of a continuum of increasing severity and inability of providing care. The size and nature of the occasions are largely ignored. "Oh shit" occurs across a range of occasions whose origin is either inside or outside of the facility.

Second, it shows that the stability of their system is understood relative to their ability to interact with other groups—patients, for example—and this is a continuously varying thing that can never be known entirely in advance. In this sense they are never free of crises and disasters for they cannot define what is normal. Instead, they are always in the prodrome of a crisis: a sudden surge of patients, an earthquake, a power failure, a staff shortage can happen anytime and simultaneously. In a real sense hospital staffs' attempts at improving the resilience of their organizations is always incomplete, in process as it were.

Quarantelli (1987; 1994) and Dynes (1998), among others, have argued for the value of a social rather than a religious or geophysical understanding of disasters. It is

nevertheless the case that accepting a social organizational conceptualization of disasters requires the specification of the social settings that experience and must respond to sudden change in demands for their expected services and/or the satisfaction of values. Dynes (1998) privileges the community and sectors within it, while Stallings (1998a,b) argues that the more inclusive concept of institutions, such as "the political, economic, religious, scientific, educational, and familial spheres in a given society" (b: 223) would provide the more theoretically appropriate locus. We find Stallings' conceptualization useful, particularly the claim that all institutions have routines, that change in institutions is ubiquitous, and that disasters can be understood as types of disruptions of the routines of institutions that in turn produce adaptations, what he calls exception routines, that over time become routine. This process of routinization is illustrated by our findings, which show how organizational adjustment takes place in the hospitals in the study.

Zoltan (1998: 47) defines institutions as abstract social objects that a) include norms and rules for social action, built of "various combinations of preferences, ideals, values, norms, and rules," b) have consequences, influencing what people believe and decide to do, and c) are the product of both design and broad interest group preferences. Moreover, within institutions there are two other levels of analysis that are necessary to make sense of the institution-disaster link. One is the meso/middle level of analysis, or the complex organizational, for every institution in a society has its own set of complex organizations, corresponding to North's (1995: 15) epigrammatic statement to the effect that institutions are the "rules of the game and organizations are the players." The other is the micro level of analysis, focusing on personality and small group interactions. A comprehensive analysis of disasters from the perspective of institutional analysis would mean assessing the institutional

values and norms providing guidance to the behavior of people and organizations faced with potential and realized is, the rhetorical contexts in which debate about hazards and risks is structured in these complex organizations and other institutional settings, and the prevailing interpretative schemes used to judge the behavior of social actors, the semiotic codes, that provide explanations and justification to lines of social action (Swidler, 1986). From this theoretical perspective, a satisfactory analysis of disasters would capture people's understanding of social processes in occasions of collective stress as well as the organizational arrangements and patterns of the institutions impacted by risks and fears of hazards, particularly how such practices are impacted by distinctive social space and time understandings.

The primary findings in this study support this institutional view of disaster. Hospitals are complex organizations that are important components of the health care delivery system. They have considerable autonomy from community and other social organizations. In practice, they do not differentiate among the occasions of emergencies, crises, and disasters but instead engage in constant preparation and mindfulness justified by patient health welfare rhetoric, in what Stallings (1998a) has called the routinization of the effects of these exceptions that gradually increase their resilience.

What constitutes disasters for the hospitals in our study is not only or primarily what staff defines as disasters subjectively, as certain social constructionist views would advance, for staff's claim-making takes place in the context of assessments of the technical capacities of hospitals to handle the demands brought about by various occasions. Thus, in the aftermath of the 9/11 World Trade Center terrorist attack most hospital staffers in the New York and New Jersey areas would have referred to this occasion as a disaster, which it was

for the lower Manhattan community, although it was not for the hospitals in the region, for the occasion did not challenge the established emergency response system of New York and New Jersey hospitals. The WTC terrorist attack did not impact hospitals directly; the acute stage of the crisis had a beginning and an end; its geographical location was well understood; it required the enactment of existing hospital procedures; the type of trauma and injury from occasions of its type is part of standard medical practice and training; its likely demands on the regional system of hospitals could be handled. The occasion did not bring about a break with established arrangements (Stallings, 1968; 1970; Quarantelli, 1970). Rather, the WTC occasion was more like a large emergency or accident for these hospitals (6). Contrast the type of demands that the 9/11 attack created for local hospitals to a deadly pandemic produced by unknown biological agents for which treatment and therapy are not well established in medical practice, impacting the population of a whole region or the entire country and among them the staff of hospitals and their families, for which it is very uncertain how it began or will end. This type of terrorist attack would have created much more serious challenges to hospitals. The point to be made, however, is that it is not a matter of denying the appropriateness of people's perceptions but of determining how and to what extent they are relevant for specific analytical purposes; an institutional perspective provides the appropriate disciplinary context for understanding the social construction of disaster claims.

An institutional approach to disaster studies would also shed greater insight into the proposition, at the center of Charles Fritz's classic definition of the field, that disasters are produced by risks that create demands that exceed the capacity of social organizations to handle, for institutions are social organizations that differ in their tendencies to become

victims of disasters as disruptions in Stallings' term, their resilience to such disruptions, the extent to which they show mindfulness and incorporate hazards' demands into their operations and increase their resilience, and the rhetorical and ideological arguments that justify lines of action and their relative openness to transformation during disaster occasions. This is the still-to-be done disciplinary effort to advance the study of disasters by developing an appropriate typology of institutions and exploring how they construct disasters and respond to them as specific types of disruptions. Thus some very general questions: what is the most theoretically useful way to think about institutions, organizational adjustments, and social change? What sort of social change is represented by disasters? What determine the ways institutions incorporate disaster demands into the change process and the relative effectiveness of such incorporations? To a very limited extent, the findings of this study begin to provide answer to these questions.

References Cited

American Hospital Association

1966 Readings in Disaster Planning for Hospitals. Chicago, Illinois: American Hospital Association.

American Hospital Association

1972 Safety Guide for Health Care Institutions. Chicago, Illinois: American Hospital Association.

Auf der Heide, Erik

2000 Disaster Response. Principles of Preparation and Coordination. Atlanta: Center for Excellence in Disaster Management and Humanitarian Assistance, Online edition, http//www.coe-dmha.org/dr/flash.htm

Brown Jr., B.

1979 Risk Management for Hospitals: A Practical Approach. Aspen: Germantown

Caulkin, S.

1998 "Crisis Management, All Day, Every Day." Management Today, April: 46-51.

Chambliss, Daniel F.

1996 Beyond Caring. Hospitals, Nurses and the Organization of Ethics. Chicago: The University of Chicago Press.

Chavez, C. W. And B. Binder

1996 "A Hospital as Victim and Responder: The Sepulveda VA Medical Center and the Northridge Earthquake." The Journal of Emergency Medicine, 14: 445-454.

Dynes, R.

1998 " Coming to Terms with Community Disasters." In E. L. Quarantelli, editor, What is a Disaster?: 109-126. New York: Routledge.

Editor

2001 "Responding Effectively in the Midst of a Natural Emergency." Joint Commission Perspectives, Special Issue, 21 (in "http://www.jcrinc.com/subscribers/perspectives" www.jcrinc.com/subscribers/perspectives).

Elling, R. H. and S. Halebsky

1961 "Organizational Differentiation and Support: A Conceptual Framework." Administrative Science Quarterly, 6:185-209.

Fagerhaugh, S., A. Strauss, B. Suczek, and C. Wiener

1987 Hazards in Hospital Care: Ensuring Patient Safety. Jossey-Base: San Francisco.

Garber, A., L. Sparks, and A. Kornfeld

1978 Hospital Crisis Management: A Casebook. Aspen: Germantown.

Gardner, J.

2001 "Song and Dance: The AHA says Hospitals are Disaster-Ready, but Extra Funding Wouldn't Hurt." Modern Healthcare, 31:9.

Haas, J. Eugene and Thomas E. Drabek. 1970. "Community Disaster and System Stress: A Sociological Perspective." Pp. 264-286 in Joseph McGrath, editor. Social and Psychological Reaction to Stress. New York: Holt, Rinehart and Vinston.

Johnson, Donna

1976 "On Observing Natural Systems. Francisco Varela in Conversation." The Co EvolutionQuarterly (summer): 26-31.

Kates, R. W.

1985 "Success, Strain, and Surprise." Issues in Science and Technology, 2 :46-58.

Morgan, Gareth

1986 Images of Organization. New York: Sage.

Mileti, D. S., Drabek, T. E. & Haas, J.E.

1975 Human systems in extreme environments: A sociological perspective _Program on Technology, Environment and Man. Monograph #21. The University of Colorado: Institute of Behavioral Science.

Nigg, Joanne M.

2000 "Social, Economic and Policy Issues Associated with Health Care Facilities." In G. C. Lee, M. Ettouney, M. Grigoriu, J. Hauer, J. Nigg (eds.), Proceedings of the MCEER Workshop for Seismic Hazard Mitigation of Health Care Facilities: 101-105. Buffalo, New York: University of Buffalo State University of New York.

Peters, M. S.

1996 "Hospitals Respond to Water Loss During the Midwest Floods of 1993: Preparedness and Improvisation." The Journal of Emergency Medicine, 14:345-350.

Renn, O., W. J. Burns, J. X. Kasperson, R. E. Kasperson, P. Slovic

1992 "The Social Amplification of Risk: Theoretical Foundations and Empirical Applications." Journal of Social Issues, 48:137-160.

Reynolds, Susan and Joseph E. Wright. 1976. Selective Literature Review of Disaster Medical Services. Columbus, Ohio: The Ohio State University Disaster Research Center, Working Paper no. 64.

Roskelley, Scot

1994 "Hurricane Sends Communication Back to Basics." Public Relations Journal, (March):32-39.

Simon, Herbert A.

1982 Models of Bounded Rationality. Cambridge, MIT Press.

Siwicki, Bill.

1992 "Hospitals, Chapters Weather Hurricane Andrew." Healthcare Financial Management, 46:72-74.

Stallings, Robert A.

1968 Structural Change in Professional Organizations: A Hospital's Response to Disaster. Columbus, Ohio: The Ohio State University, M.A. Thesis.

Stallings, Robert A.

1970 "Hospital Adaptations to Disaster: Flow Models of Intensive Technologies." Human Organization, 29:294-302.

Stallings, Robert A.

1998a. Disaster and the theory of social order. In E. L. Quarantelli, editor, What is a Disaster?: 127-145. New York: Routledge.

Stallings, Robert A.

1998b Reply to Perry's Reaction Paper. In E. L. Quarantelli, editor, What is a Disaster? 222-225. New York: Routledge.

Strauss, A.,L. Schatzman, D. Ehrlich, R. Bucher, M. Sabshin

1963 "The Hospital and Its Negotiated Order." In E. Freidson, (ed.), The Hospital in Modern Society: 147-169. New York, The Free Press.

Slovic, P.

2000 The Perception of Risk. London: Earthscan Publications Ltd.

Sudnow, D.

1967 Passing On: The Social Organization of Dying. Englewood Cliffs, New Jersey: Prentice-Hall.

Tanaka, H., A. Iwai, J. Oda, Y. Kuwagata, T. Matsuoka, T. Shimazu, T. Yoshioka

1998 "Overview of Evacuation and Transport of Patients Following the 1995 Hanshin-Awaji Earthquake." The Journal of Emergency Medicine, 16:439-444

Taylor, Verta.

1974 Hospital Emergency Facilities in Disaster: An Analysis of Organizational Adaptation to Stress. Columbus, Ohio: Disaster Research Center, Preliminary Paper No. 11.

Tierney, Kathleen J., Michael K. Lindell, Ronald W. Perry.

2001 Facing the Unexpected. Disaster Preparedness and Response in the United States. Washington, Joseph Henry Press.

Organización Panamericana de la Salud

2002 Crónica de Desastres. Terremotos en El Salvador, 2001. Washington, D.C.: Programa de Preparativos Para Situaciones de Emergencia y Socorro En Caso de Desastres.

Quarantelli, E. L.

1987 "What Should We Study? Questions and Suggestions for Researchers About the Concept of Disasters." International Journal of Mass Emergencies and Disasters, 5:7-32.

Quarantelli, E. L.

1994 Sociological Research Agenda for the Future: Theoretical, Methodological and Empirical Issues. Newark, Delaware: Disaster Research Center Preliminary Paper no. 228.

Quarantelli, E. L.

1970 "The Community General Hospital. Its Immediate Problems in Disasters." American Behavioral Scientist, 13:380-391.

Webb, G.

2000 "Restoration Activities Following the Marmara, Turkey Earthquake of August 17, 1999." In Research Progress and Accomplishments: 97-109. Buffalo: University of New York at Buffalo, Multidisciplinary Center for Earthquake Engineering Research.

Weick, K. E., K. M. Sutcliffe, D. Obstfeld

1999 "Organizing for Reliability. Processes of Collective Mindfulness." Research in Organizational Behavior, 21:81-123.

Weick, K. E.

1987 "Organizational Culture as a Source of High Reliability." California Management Review, 29:112-127.

Whitney, D., A. Dickerson, M. Lindell.

2001 "Nonstructural Seismic Preparedness of Southern California Hospitals." Earthquake Spectra 17:153-172.

Table 1: Number of Health Care Facilities by Size, Region, and Participation.

Region	Large-sized		Medium-sized		Small-sized		Total Contacted	Total Participated
	Contacted	Participated	Contacted	Participated	Contacted	Participated		
California	1	1	3	2	2	1	6	4
Tennessee	5	4	0	0	2	1	7	5
New York	10	1	2	1	4	2	16	4
Totals	16	6	5	3	8	4	29	13