Chapter 1

Introduction to Disasters and Disaster Planning

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Preface

Disasters affect millions of people worldwide annually. From natural disasters such as tropical cyclones and earthquakes\(^1\) to terrorist threats from biochemical weapons or improvised nuclear devices,\(^2\) the world is becoming an ever more dangerous place to live in the twenty-first century. In fact, a major disaster occurs somewhere in the world almost every day, and a natural disaster requiring international assistance occurs approximately once a week.\(^3\) The public health burden of disasters is particularly overwhelming in the developing world where the infrastructure is suboptimal at the best of times.\(^1\) The 7.0 Haiti earthquake of January 12, 2010 that leveled much of Port-au-Prince is a perfect example of this problem. On the other hand, Hurricane Katrina demonstrated that North America is not immune to the devastation of nature’s wrath.\(^4\)

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What Is a Disaster?

The word “disaster” is intuitively simple to understand yet the literature is replete with differing definitions. How then can one best define what constitutes a disaster? According to the United Nations Disaster Management Training Program\(^5\):

A disaster is a catastrophic occurrence, a sudden or major misfortune that disrupts the basic fabric and normal functioning of a whole society or a community within it. It is an event or series of events which gives rise to casualties, damage to or loss of...
property, infrastructure, essential services, or means of livelihood on a scale which is beyond the normal capacity of the affected communities to cope with unaided.

From a healthcare standpoint, disasters usually cause numerous casualties—so-called “mass casualty incidents” or MCIs. An MCI may be defined as:

An incident that results in multiple casualties that overwhelm local resources and that may involve natural, biological, chemical, nuclear, or other agents.

Therefore, an MCI exists whenever the number of casualties exceeds the facility’s ability to cope. So, if a school bus were to crash injuring 30 children, an MCI would exist for a rural hospital with a 6-bed Emergency Department. An MCI would not exist if the injured children were transported to the Emergency Department of a large tertiary care Children’s Hospital. On the other hand, a major chlorine spill with 2000 inhalational casualties would represent an MCI even in Vancouver’s world-class hospital system.

An Overview of Disaster Planning Principles

It is important to understand some general principles about disaster planning because a poorly planned disaster response is often a major problem in itself. This was amply demonstrated in the aftermath of Hurricane Katrina. Some of the early, seminal work in the area of disaster planning was undertaken at the Disaster Research Center (DRC) of Ohio State University in the 1960s. Quarantelli’s group at DRC has contributed a great deal to the literature in this area and they define disaster planning as “...an attempt, prior to the actual occurrence of a crisis, to facilitate recognition of emergency demands and to make more effective the community response.” They enumerated some important characteristics of disaster planning that should be kept in mind:

1. Disaster planning is a continuous process—an unrevised, out-of-date plan is worse than no plan at all because it engenders a false sense of preparedness—the so-called “paper plan syndrome.” In fact, well-prepared hospitals make it a policy to develop a disaster plan, exercise it until it breaks, re-design the plan to fix the inherent flaws, and then exercise it again (until it breaks...). The importance of this iterative approach to disaster planning cannot be overstated.

2. Planning seeks to reduce the unknowns in problem situations—one tries to anticipate problems that will crop up and provide solutions in advance that will mitigate the potential effects. Floods cannot be stopped but the damage to infrastructure and potential loss of life can be mitigated through careful planning.

3. Planning tries to foster appropriate, effective actions in a crisis—it may seem natural to rush right out after a calamity and start “doing something” but it is far more effective and efficient to first gather the necessary information. This so-called “rapid needs assessment” allows the disaster response to be tailored to actual needs on the ground in the disaster zone and avoids well meaning but ill-advised impulsivity. “Don’t just do something, stand there” is the operative notion here.
4. Planning should be based on what is most likely to occur—designing a disaster plan based on idealistic, naive thinking is distinctly counterproductive. One must recognize and plan for what people are likely to do and not create elaborate plans that try to get the population to do things that do not “come naturally” when under duress.

5. Planning must be grounded in fact, not supposition and myth—there are numerous false assumptions about disasters which have been debunked in the literature but which are still prevalent in the minds of planning officials such as:
   - People will panic (this is actually rare)—in fact, people often refuse to evacuate despite mandatory evacuation orders.
   - People will be immobilized by fear (“disaster stunned”)—actually, the local community usually pulls together immediately and helps one another.
   - Local organizations will be paralyzed—local groups become the focus for community response.
   - Antisocial behavior will be common (looting, etc.)—this actually occurs in a minority of situations (New Orleans after Katrina notwithstanding).
   - Community morale will be low—often disasters cause dramatic “community mindedness” and laudably altruistic responses from local citizens.

6. Planning should focus on broad principles and not on minute details—the “all hazards” approach to disaster preparedness. Rather than developing detailed, specific plans for each possible disaster, instead basic principles of action should be the focus of attention. In fact, detailed tome-like disaster plans are often developed for accreditation but are uniformly ignored in practice because no one has read them and they are not practical to implement.

7. Planning is an educational activity—part of the purpose of planning is to engage stakeholders in a process that heightens awareness and fosters resilience in the face of a crisis. Such an educational approach to disaster planning empowers stakeholders with the “can do” attitude so important in crisis management.

8. Planning always faces resistance—especially when no calamity has occurred for many years, it is notoriously difficult to engage communities in expensive, time-consuming disaster planning and exercising.

**Phases of an Emergency**

Traditionally, disasters have been conceptualized as having preimpact, impact, postimpact, and recovery phases. The National Framework for Health Emergency Management similarly uses the terms pre-event, event, and postevent. Pre-event activities include risk assessments, mitigation, and preparedness. The event may be either static—as a single point in time, such as an explosion or crash, or dynamic—evolving over time, such as a pandemic. Response and recovery occur during the postevent.
Risk Assessment

Two approaches can be used when considering risk. The first is to use the “all-hazards” approach as previously mentioned in which a generic plan is devised that is most often designed to deal with a “worst case” scenario. When an organization is in the early stages of developing its emergency response capacity, an “all-hazards” approach will ensure that at least a basic and consistent capability to respond exists. Advantages of the “all-hazards” approach include less time required for planning and being prepared for the unexpected. The “all-hazards” plan is a generic basis for most events that allow planners to add on components for unique emergencies such as chemical, biological, radiological, or nuclear events.

Once an organization, such as a hospital, has established a generic all-hazards plan, it can then enhance its capacity by developing hazard-specific plans. Note that these hazard-specific plans can be appendices for the basic “all-hazards” plan and should not be overly long as such tomes usually get ignored in a crisis. Such appended plans require that a hazard-vulnerability analysis (HVA—a specific type of risk assessment) be conducted to identify possible hazards, followed by a prioritizing exercise based on their probability and potential impact. High-priority hazards include those that are highly likely to occur, as well as those that are less likely to occur, but would have a devastating impact if they did. Risk assessments should be comprehensive and include both internal and external threats to individual wards or departments and to the facility as a whole. Participants in this process should include representatives from front-line staff, administration, and experts in emergency preparedness. Similar institutions, historical records, and individuals with knowledge of the institution’s history should be consulted to learn from past events. Finally, assessment tools have also been developed to aid healthcare facilities in conducting their own risk assessments (see Chapter 2).

The risk assessment process should not be conducted in isolation. Although healthcare facilities are essentially small communities unto themselves, it is important that they work with the larger community in which they reside. Community emergency preparedness plans often stop at “patients are transported to hospital,” whereas hospital plans begin with “patients arrive from disaster,” without consideration of shared risks or integrated planning. External threats to healthcare facilities can have profound implications that prevent the hospital from fulfilling its mandate, thereby jeopardizing the overall community response. The recent severe acute respiratory syndrome (SARS) outbreak demonstrated that internal hospital events can have serious consequences for the surrounding community. Hospital disaster planners should periodically meet with their counterparts in the community as well as with police, fire, and first responders to ensure that the disaster plans mesh well.

Mitigation

After specific hazards have been identified, it may be possible to help mitigate the risk they pose to the healthcare facility. Mitigation can be through either structural adaptations, such as building improvements, or nonstructural measures, such as policy changes. This is the emergency preparedness equivalent to “preventative medicine.” Building redundancy into the key systems of the
healthcare facility is one way in which mitigation can be achieved. Since not all risks can be mitigated, preparedness activities are required to manage an emergency should one occur.

The aviation industry is a common model that can be used when considering crisis management and response. Airplane crashes are highly visible disasters that share many commonalities with other types of emergencies. A review by the US National Aeronautics and Space Administration following a series of airplane crashes led to the development of the “cockpit resource management” system designed to help prevent future crashes by mitigating causative factors and improving the pilots’ ability to respond effectively when problems do arise.20 Cockpit resource management includes 4 key components: error identification and management, protocol driven crisis responses, human factors training, and simulator training. Many of these same principles can be applied to help healthcare facilities prepare for disasters and improve healthcare workers’ capacity to respond. Furthermore, the cockpit resource management system may have a secondary benefit of reducing medical errors.20–26

Disaster Preparedness

Disaster preparedness is more than simply disaster planning. It has multiple domains from a healthcare viewpoint27:

- Prevention of morbidity and mortality
- Provision of casualty care
- Ability to manage adverse climatic and environmental conditions
- Reestablishment of healthcare infrastructure
- Protection of staff, public health, and medical assets

For adequate disaster preparedness, multiple areas of concern must be addressed27 including:

- Vulnerability assessment (e.g., HVA).
- Development of disaster planning.
- Training and education of first responders, civic leaders, and the citizenry.
- Development and deployment of early warning systems.
- Interoperable communications allowing response personnel to interact easily.
- Adequate information and resource databases and their ongoing management.
- Maintenance of adequate resource stockpiles.
- Regular disaster drills (drill till the plan breaks, fix the problem that caused the break, then drill again…).
- Adequate incident management system (and all personnel readily familiar with their roles in the system).
In a well-developed disaster plan, there are multiple components including:

- The basic plan including policies, responsibilities, and a concept of operations (CONOPS) plan.
- Functional annex—containing the organization of tasks required to complete various critical functions.
- Hazard-specific appendices—based on the HVA for the hospital—what will be done for each specific hazard in a disaster.
- Standard operating procedures (SOPs) for responders—the rules of engagement as it were.

Most of the medical planning required for disasters revolves around core public health issues such as provision of clean water, safe food, adequate shelter, and sanitation. Other public health issues that should be addressed include vector control (e.g., mosquitoes and standing water), toxic (HAZMAT) exposures in a disaster, management of fatalities, management of animals affected by the disaster, and management of chronic illnesses in disaster-affected individuals. Too many disaster plans focus on “heroic” mass casualty care (mobile ORs and the like) while not paying adequate attention to public health basics that will have far more benefit on a population basis.

**Recovery**

The transition from response to recovery is graded and in many cases both actions occur simultaneously. The speed with which an organization can return to normal functioning is an indicator of the organization’s overall ability to manage an emergency. Given the importance of the healthcare system to the overall community, it is essential that the healthcare organization not only have a response plan but also an operational, or business, continuity plan. Just as the response plan identifies a team to deal with an event, it should also identify a team to coordinate the recovery. The Emergency Control Group, led by the CEO, oversees both the response and recovery activities. In many instances, the recovery activities will be shaped by the lessons learned from the disaster and thus lead full circle to mitigation actions to prevent a similar situation in the future.

**References**


