

Commentary

Disaster preparedness perspective from 90.05.32w, 29.57.18n

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Abstract

A major disaster occurred in a major city in the USA. The aftermath produced significant difficulties in patient care. Failure of the communication system, lack of command and control, and incomplete planning were at the root of all of these difficulties.

Introduction

Despite what the Federal Government would have you believe, disasters in the USA (and most of the rest of the world) will probably not result from biochemical terrorism or weapons of mass destruction. Such events could happen, but over the past 20 years, including the period since 9/11, disasters have resulted primarily from natural causes, blasts, or structural collapse. Because such disasters are the most common, it is for these that we must prepare. Biochemical terrorism and use of weapons of mass destruction are possible, but the same principles of patient care apply to these events and the more common disasters, but with some variations. Principles vs preferences The principles apply to all. The preferences will vary according to etiology. The ole medical school axiom still applies – when you hear hoof beats, expect horses not zebras.

Most physicians in the USA are not informed about disaster management, have only a very superficial knowledge of the preparations made by their individual hospitals or within their community, and have not participated in local disaster drills. There are several reasons for such lack of knowledge: 'it has never happened here, so I won't waste my time learning about it'; 'the nurses and administrators do all the planning and don't include me'; and 'the drills are all about uncommon events involving things like biochemicals; these events are unlikely to happen so why should I play their silly games?'

When a disaster does occur, the physicians are mentally unprepared for the constraints imposed by the situation and do not understand the new paradigm for patient care. With such a lack of knowledge, they become part of the problem rather than part of the solution because they refuse to follow the game plan, dropping out completely or trying to impose their own ideas that are not consistent with the disaster

management strategy. A confounding factor is that the drills are seldom, if ever, practiced in real time to acquire knowledge of the peculiarities that result from local conditions.

The response to disasters can be divided into three phases: immediate (local), external assistance, and backfill (resupply). Patient care will be driven by the availability of people, supplies, and equipment within these three phases (Table 1). Furthermore, there are two types of disasters, with significant differences in planning requirements, management, and outcome, namely those with and those without infrastructure failure. Katrina demonstrated both of these types. In New Orleans the disaster produced infrastructure loss; the same hurricane produced a disaster in Houston but the infrastructure remained intact.

Immediate

For the first 2–6 days after a disaster, the response and medical care will come from local health care providers, using supplies that are on hand, equipment that is not damaged by the incident, and treating patients with illness and injuries who fall into the following categories: those present within the hospital prior to the incident; those with injuries that are the immediate result of the incident; and those with pre-existing conditions. The first group of patients to be addressed is those who were in the hospital when the situation occurred. Their care will be modified by loss of power and restricted availability of food, water, and medications. In Katrina, because of the isolation (the hospitals became islands without access from or to the outside) there was no replenishment of much needed supplies, including diesel fuel for the backup electrical generators.

Preparation includes ensuring availability of everything that will be required to care for patients; these supplies include potable water, food and medical supplies (including medication and oxygen), but also various other items that are critical but do not necessarily pop to one's immediate consciousness. The latter might include a week's supply of diesel fuel and human waste disposal facilities (e.g. a red

Table 1

Response phases	
Phase	Details
Immediate	2–5 days without help Local resources only Preparation: Storage Detail planning Practice Communication Command and control Patient care Evacuation
Regional/national	Access to disaster site Physical limitations Legal limitations Political limitations Communications Local system Access to outside Command and control Organization
Backfill	People Equipment Supplies

human waste bag placed over a toilet and a couple of scoops of kitty litter significantly reduce the contamination and odor that occur when toilets fail because of loss of water pressure and sewerage overflow). When these items are in storage they must be inspected periodically to replace expired items, and security services must be available to protect against pilferage by two-, four-, and six-legged creatures.

As has been discussed following every disaster in the USA (and Katrina was no exception), communication failed. Cell phones worked sometimes but there were too many people trying to make calls, too many towers had been blown down, and without power the batteries could not be recharged. Satellite phones did not work in the buildings and only about 50% of the time while standing in the parking lot. Handheld push-to-talk phones and radios need access to repeater towers and also need to be recharged. Power outage also has an impact on hospital phone networks; paging, and internal and external phone calls are lost.

The only phones that remained functional after Katrina were the old-fashioned, non-battery-powered direct lines to Bell South. These phones were on local lines, and calls out of the city for help had to be charged to a credit card. Phones that went through the hospital network and trunk lines failed when the power was lost. Information exchange within the hospital was by runners.

Communication between Charity Hospital, University Hospitals, and Tulane University Medical Center was via messengers wading through contaminated water or paddling canoes, via notes carried by boat drivers, or on occasion via bullhorn to bullhorn from the roof of the hospital. No direct voice-to-voice or other real-time communication worked. Such poor information exchange produced lack of understanding, confusion, misinterpretation, and out of context appraisal. All of this led to poor exchange of information between individuals, hard feelings, lack of coordinated patient movement, and on occasion poor or delayed patient care.

As a result of the communication breakdown, there was no city-wide command and control. Every island was left to function on their own, setting their own rules and planning their own evacuation, security, and resupply.

Evacuation of patients, health care workers, families, and refugees was done by boat, large military trucks or helicopters. Boats worked for a while until one of them was 'boat-jacked' and the driver shot. The downside of the boats was that they carried people to the freeway, where queues for the buses were long and minimal patient care was available, and no medical care was provided *en route*. There were similar downsides to the use of trucks. The only viable transportation for patients was via helicopter to another medical center or to an airport with ground medical transportation. With all of the local hospitals effected by Katrina, the transportation time and therefore return to pick up other patients was 1–2 hours. To evacuate patients from hospitals in a timely manner, many helicopters were needed. For the entire evacuation process 250 landings and takeoffs occurred.

For a helipad, light poles were pulled from the top of the parking lot adjacent to the hospital to provide a landing zone. The initial design of the parking lot had accounted for the stress exerted by a heavy helicopter. Both Blackhawk and Chinook helicopters landed without difficulty. To control for potential overload of the landing zone due to weight of the larger helicopters and to make use of aircraft as efficient as possible, all patients, health care workers, and other personnel were loaded 'hot' (no engine shutdown and with rotors turning).

There are additional unexpected patients and other personnel who arrive at a medical facility and must be cared for and evacuated. This must be taken into consideration in developing plans for disaster management. For example, at the time when Katrina hit, there were 110 patients, 800 medical personnel, and about 200 other personnel at Tulane University Medical Center. At the completion of the evacuation process, 254 patients and 1400 medical personnel, family members, and others had been evacuated (i.e. 1110 patients and others versus 1654 evacuees).

Regional/national response

The regional/national response should be set up to achieve several goals: to provide immediate assistance in the management of patients; to provide or assist with evacuation; to replenish supplies; and to provide rest for weary personnel on a gradual replacement basis with overlap. With Katrina, in two of the three hospitals there was difficulty in achieving any of these goals. The author does not know the etiology of the failure at the time of writing. It can only be speculated upon, and therefore will not be addressed here. Tulane University Medical Center was able to respond to requests for assistance in the first three categories. The last category is not applicable because the Center was completely evacuated.

Throughout the region, however, there were significant areas of failure. National/regional assistance came late, was blocked by local authorities that perhaps did not understand the need, and was inadequate to meet the needs. Failure of the communication system, lack of command and control, and incomplete planning were at the root of these problems.

Backfill/resupply

Backfill (or resupply), as the term implies, requires additional personnel to replace those who were on the frontline for the first few days and have become tired and spent. Such additional personnel include physicians, nursing and maintenance personnel to staff the hospitals or new or portable hospitals, and ambulance personnel and units to relieve the emergency medical service staff who were initially present.

In Mississippi, the inflow of backfill personnel from both military and nonmilitary sources seemed to work smoothly. Reports from volunteers who attempted to assist in Louisiana suggest that backfill did not work as well there. The sources of the constraints are difficult to identify.

The USNS Comfort arrived in New Orleans and sailed out in under 2 weeks. This occurred at a time when the trauma center and all of the major hospitals in the city of New Orleans were disabled or were beyond reasonable repair and condemned. Three hospitals in the neighboring parish (Jefferson) were stretched to capacity and were at the point of refusing patients (because of lack of nurses to open beds) when the Comfort was ordered to sail. This left only a military combat support hospital unit and two or three emergency tent-type units. The mission of the combat support hospital is to provide initial patient care and then transfer patients to a full service hospital within 48 hours. Therefore, area hospitals had to agree to accept transfer of these patients. In many instances this was difficult because of lack of bed availability.

This highlights two major current and impending problems in the system. First, the lack of nurses means that major hospitals cannot open beds. Volunteer nurses have difficulty in getting jobs in the hospitals (credentialing), and local

nurses working in the hospitals cannot find houses or apartments to live in. Second, the large mobile hospital (USNS Comfort) was ordered to leave as more patients were being admitted. It did not stay to support the surge as residents returned to the city and while major construction was ongoing. At the time of scheduled departure of the combat support hospitals from New Orleans (in 3–4 weeks at the time of writing), no major hospitals will be fully operational in the city.

Failure of the communication system, lack of command and control, and incomplete planning is again at the root of these problems.

Conclusion

The Katrina storm and resulting flood devastated the vital city of New Orleans stands testimony to the inadequacy of multi-level rescue and recovery systems. Failure of these systems due to ineffective planning and lack of effective command authority must be addressed in the future.

Competing interests

The author(s) declare that they have no competing interests.