USE OF DECOMMISSIONED HOSPITALS AS TEMPORARY CARE FACILITIES FOR PATIENTS IN A MASS CASUALTIES INFLUX

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Abstract
The health care system in America is close or very near to the limit of its operating capacity, both in urban and rural environments, with very little opportunity to expand if needed to respond to unusual events with an influx of mass casualties or a sudden event [1].

This activity is managed by public health administrations which are organized so that to update the evidence on shuttered hospital capacities and status of each health facility.

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Hospital financing and economy has largely been directed towards reducing drastically the excess capacity of the system. Hospitals are almost entirely operating close to their full capacity in many cities; on the other hand, there is a very little excess capacity in nursing homes, health houses and other facilities of the health system.

Patients can not be quickly moved out of the hospital to be replaced with victims (traumatized or infected patients), due to the fact there is no place where they can be moved. As it is recommended, to move and evacuate about 30% of inpatients in a hospital to create free beds for victims of a disaster, it is a desideratum that often it is difficult to be accomplished [13].

Jeffrey Rubin, in "Recurring Pitfalls in Hospital Preparedness and response" notes that despite the requirements, standards and best intentions, the combination of personnel and equipment shortages and lack of adequate capacity as the main block to adequate surge capacity [3].

Furthermore although there have been and continue to be the substantial improvements, most hospitals are still unprepared to implement and effectively manage an incident that has mass casualties, requiring a rapid expansion of hospital capacity for a sustained period beyond the incident’s onset [5].

In a presentation to the Defense Industry Association, "Hospitals and health care systems, their momentary ability" [4], Donna Barbish discussed options for expanding the momentary capacity of hospitals which she called an expansion of a "planned degradation of care.” This suggests that it is required:
- Converting existing buildings into temporary hospitals;
- Construction of temporary facilities;
- Establishment of protocols relating to emergency care standards and appropriate procedures;
- Partnership for development of intra-and extra hospital emergency capabilities.

U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA) funds emergency preparedness in the United States and calls for a plan to resolve the peak demand in management of health care. This project uses the state Massachusetts experience as a case study to explore the use of closed hospitals for medical care momentary capacity expansion.

In Massachusetts, there is a plan that covers the entire state to help regions to allocate "momentary capacity beds" - which exist and contribute through local hospitals to a system that will eventually allow regional coordinators to identify and distribute free beds for patients in these beds that exists [7].

Keywords: health care capacities, hospital beds, number of hospitals, influx of casualties, shuttered hospitals.
Although this type of planning and coordination could help redistribute a few dozen, or even several hundred, patients so far it has not been tested or used in exercises or real-time scenarios.

In a hospital system working close to maximum capacity as those of the great Boston, the relocation of patients will be inadequate to meet the momentary hundreds or thousands of patients with trauma or infection and is not sustainable for more than a few days following an event. Regional planning councils are underway to consider other possibilities for expansion of capacity at the moment.

**What supplementary capacity is needed?**

In a report issued in 2003, Massachusetts emergency preparedness planning divided the state into six regions to address peak demand for health care of patients as well as other needs. The Department of Public Health indicated that it would draw up plans for hospitals in each region so as to cope with an increase in capacity up to 500 patients over the capacity of beds approved for them. Planning will ensure the care of an additional number of 3,000 patients in the entire state. In other words, the task of planning for providing care to further momentary patients will provide an additional 3,000 hospital beds in the state.

In an update of 2004, the Department of Public Health (DPH) increased the required number of hospital beds currently to 3,214 and identified two possible sources of beds required: (a) approximately 1880 licensed, but unstaffed beds in existing hospitals and (b) approximately 1,200 licensed beds that can be achieved by early discharge and transfer patients to other locations or by delaying non-urgent procedures, etc.

The plan for early discharge and non-urgent surgical procedures delaying is not fully sustainable because the patients that were discharged more quickly than is usual, often requiring readmission more frequently than other patients, and those with non-urgent surgical conditions that were postponed become more urgent as time passes.

Accordingly with this estimation, it is need of 124 patient beds.

**The use of closed hospitals to expand the surge capacity**

In the late of the year 2003, recognizing that relocation of existing patients to hospital beds will not be adequate for a large-scale disaster or even a moderate wave of patients, the Working Group of the Department of Public Health of Massachusetts has set up a subcommittee to study the use of facilities that have been closed. The minutes of the first meeting of this subcommittee concluded that the purpose of this group is to “use the closed facilities to create a surge capacity.” Department of Public Health presented a graph to explore places with closed hospitals, and mechanisms of rescue and their preservation and to present the following recommended steps. Department of Public Health has agreed to be a subset of “closed hospitals which work and report to the working group” [8].

**What kind of facilities can be best prepared to serve as a "surge medical facilities" and provide the necessary number of extra beds?**

Many communities across the country have experienced with the closure of hospitals, or converting some in other even non-medical facilities and administrate the buildings of the former hospitals which are not used in the medical field anymore, but are not yet fully converted. Former hospitals, that can be the best alternative as "surge facilities" ("better than churches, schools or hotels") [16] are more appropriate for inpatient care, as they were originally designed and used for such purposes having sanitary circuit system, channeling, cabling, etc..

For example, the patient beds capacity in Boston declined by almost 28%, during the decade 1990-1999 [9]. In the Boston area, some community hospitals were transformed into non-hospital services, and thus leaving large empty spaces used as rooms for patients. What happened in the Boston area is not singular: hospitalization capacity of many cities decreased dramatically in the last decade. According to the Washington DC Hospital Association, the number of acute care beds, the beds decreased in number from 4741 existing in 1994 to 2767 at the end of 2003, representing a decrease of 42% [10].

The former general hospital in Washington DC which was a level 1 center for trauma care have got approximately 850 acute care beds, and today is a pre-hospital emergency care center functioning in the former Department of Emergency [11].

**Elements of the evaluation of the correlation between the capacity of the hospital and ambulance transportation in situations of mass influx of casualties**

Accepting that a mass casualty event (events having effects among the most deadly) is inevitable we conducted a brief analysis of the correlation between the capacity of hospital units without taking into account recent structural system restrictions [13, 14, 15].

In the data presented in Table 1, we see that the ambulance services, without taking into account the transport capacity of EMSRE-(Emergency Mobile Service of Reanimation and Extrication) in Romanian SMURD, has a much greater capacity to transport than the capacity of hospitalization of all existing hospitals some time before. From here we can conclude that in the event of a mass influx of casualties that will affect several areas of the country, ambulances carrying victims of results will be crowded at the remaining hospitals, because the hospitals inadequate capacity.
Such a situation can only be overcome by reopening the closed, merged or converted hospitals, that in the haos created by such an event will be impossible to be realized, without a careful, serious and efficient planning, before such an event occurs.

Selection of the health facilities
The website for Massachusetts Hospital Association contains a list of hospitals that have been closed in the last two decades and have been converted to other purposes (table 2). Although there is no facility to meet the ideal requirements for immediate re-use as acute beds, using the following criteria they were able to identify two candidate facilities:
- The hospital was not physically damaged beyond a point that jeopardizes patient safety
- The hospital has some missions or quasi-continuous medical care (but not admission) and maintain its safety systems and emergency life;
- The hospital may be readily available and ready to provide a momentary capacity within three to seven days after a flood event with mass casualties (Hospitals in Boston plan to operate at maximum capacity for up to 72 additional hours or can maintain this level for a long time) owners are willing to participate in this project and are able to work with facilities manager; and
- The facilities are close enough to calamity area to allow rapid transport of patients.

In the table 2 it is presented the list below includes hospitals closed or converted in the last decade in the vast area of Boston.
Timetable
Since area hospitals have plans in place to cope with dramatic increases in hospital capacity needs up to 72 hours after the event has adopted a presumption that the facility should be opened momentarily in three to seven days after the event with the mass influx of victims.

It is anticipated that these facilities will be run for a period of ca., 2-8 weeks depending on the nature and needs of disaster victims in mass care. Although they are not in full operational period.

Presumptions patient population
In order to estimate the necessary equipment and materials is assumed that the temporary facility will operate at a capacity of 100% (ie a maximum of 300 patients at the hospital from the day 3-7 and continued for at least 30 days after the declaration of emergency. In assumptions made it is assumed that the hospital will continue to have normal capacity and the 30th day. This period is arbitrary since in some cases this ability can be further extended to 60 days.

Recommendations: a temporary facility can not ensure safe surgical services, ATI or emergency, these services must remain at the tertiary hospitals and temporary facilities to be used only for medical care for stable patients or those with post-operative care (thereby ensuring the release patient care capacity in tertiary hospitals).

Technology Assumptions
Since shortages of information technology can be a hindrance, hospitals can work with lower-tech substitutes (such as records on paper) or high-tech substitutes such as wireless communications. For most situations in this report it was assumed that provide voice communications are sufficient and less automated work suggests that in some situations such as those in which computer technology is readily available. More sophisticated approaches can be used where feasible, but we believe that technology should not become an obstacle during the critical window of 3-7 days.

Planning Phase
There are several identifiable phases to be taken into account including: preplanning to increase capacity after a disaster, opening day, continuing operations and facility closure.

Preplanning
A substantial part of the training time must be spent before a disaster to determine the opening of a hospital was closed and will be used as a temporary facility. A careful evaluation of the facility will be run as early as possible which will identify what is functional and what is left of what was in the hospital building. More importantly, the authorities must decide who will take responsibility for this facility and who will develop and will use.

Which will include the use of options such as a satellite hospital of a major tertiary hospital that works and is the responsibility of local or state or the possibility of combining these two approaches. Planners will have to determine what services will be contracted and what of them will be outsourced and what should be borrowed from other hospitals in the metropolitan area and what the materials and goods needed to be available at the time of a declared emergency by competent authorities, including what must be provided from the national strategic stocks.

Recommendation: It is required substantial preplanning to prepare a temporary facility, waiting until disaster occurs essentially eliminates this option.

Opening the facility within 3-7 days after the emergency is declared.
After declaring a major emergency influx of casualties and the decision to reopen some facilities were closed, the person responsible for each activity below, you will need to devote all the time to fully prepare the facility.

It is desirable to do the following tasks which mirror sections of the report are as follows:

- State Preparation Facility (structures, systems, repairs, damage removal, testing and cleaning, etc.).
- Equipment and materials (including pharmacy, laundry and cooking);
- Staffing;
- Security;
- Transportation of patients;
- Patient information systems (medical documentation).

First Day
Much will be made on the first day especially in terms of facility staff and patient transport. It is assumed that staff will be gathered (in whole or in shifts) a day or two before opening the facility so as to meet each other and become familiar with each other and the physical structure of the facility. Security staff will also need to be introduced in the physical aspects of the facility in the days before its opening and personnel exchanges that are set for opening day.

Materials and equipment will be available to those working with them so that pharmacy services, food preparation and diet, maintaining cleanliness and other ancillary services to be prepared.
A major effort will be made up of the first day of discharge patients from hospitals and their transport to tertiary facility and receiving their temporary facility. Moving patients will be facilitated by the availability of simplified transportation documents, including monitoring data of these patients prescribed medication and other needs that must be satisfied during transport. The staff wants to meet the first day a number of unexpected tasks and changing shifts to be made to cover the relevant time as smoothly as possible.

**Continuing operations**

Once open facility, team members will be responsible for continuing operations at temporary facility, entering into their roles in base hospitals. It can be assumed that most drivers will have the necessary experience teams in their area of activity. Team members will continue to provide services such as surveillance of service contracts, ensuring service quality, reduce inventory and storage problems in their areas of action and responsibility.

Staffing can be solved in the short term with the Department of Public Health and other federal elements may not be available long term. If the facility will remain open for more than four weeks will need to be made in many parts of teams.

**Interim Facility Closure**

As the state of emergency shall be reduced, interim facilities will restrict their activity until the closing. The total closure logistics manager will be responsible for termination of contracts for the supply of goods and services and the establishment of materials and equipment to be allocated to local health care system.

**Review and recalculation**

After an interim facility was closed, it is recommended that team leaders to gather and review lessons learned and to examine the data critically. These data can be used to improve planning so that if such temporary facility is necessary to carry out operations that will not repeat the mistakes that were made at the recent activation.

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