

# Managing health information during disasters

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## Abstract

Providing continuing patient care when healthcare infrastructure has been damaged or destroyed requires careful advanced planning. Substantial numbers of patients will seek medical care during a disaster, including those injured during the acute phase of the disaster, those injured in recovery and evacuation attempts, and the chronically ill who have been displaced and do not have access to their medications. As a vital department of any healthcare facility, the Health Information Service (HIS) should have a planned response for retrieving medical records, and allocating new ones, should a disaster situation occur. Problems that may be encountered by the HIS at hospitals or healthcare facilities should be identified and responses that mitigate these problems should be discussed by staff and included in a disaster plan that can be activated in a timely manner. A disaster planning strategy for the management of medical records in health facilities is outlined in this paper.

## Keywords (MeSH):

*Information Management; Disaster Planning; Disasters; Medical Records; Medical Records Department, Hospital; Public Health Administration.*

## Introduction

Disasters, whether natural (eg. extreme weather, infectious disease outbreaks) or man-made (eg. terrorism, bio-terrorism and chemical, radiological or nuclear events), can inflict widespread damage and destruction on societal infrastructure and have the potential to overwhelm local resources and capacity, including hospitals. For example, immediately following the terrorist attacks in New York City on 11 September 2001, hundreds of patients sought care at surrounding hospitals not only for injuries resulting from the attacks, but also for acute episodes of chronic illnesses such as respiratory and cardiac related problems. This influx of patients tested the capabilities of the hospitals to manage, effectively, health information and health information systems. However, the eventual number of people seeking medical care was far fewer than originally anticipated, and the hospitals returned to normal business functions relatively quickly. This would not be the case if the number of patients requiring care reached the thousands, as occurred with the natural disasters, Hurricane Katrina and Hurricane Rita.

Hurricane Katrina and Hurricane Rita will long be remembered for the damage and destruction they inflicted on the United States in 2005. Initial recovery took months; however it will take years to recover from much of the damage. The impact of the hurricanes was so huge that many healthcare facilities simply ceased to exist, leaving no trace of the patient records stored within. Unfortunately, many facilities were not prepared for this magnitude of destruction, and had no system in place to manage the potential for a total loss of all medical records.

In Australia, our recent experience with Tropical Cyclone Larry in March 2006 served as a strong reminder that our hospitals and healthcare facilities could be involved in disaster situations. The threat of SARS in 2003 and the current threat of an Avian Influenza pandemic further reinforce our need for health information systems that will be able to manage a surge of patients. Regardless of the type of disaster situation, all patients presenting to hospitals during these events will require identification (raising the issue of how hospitals and healthcare facilities will cope with unidentifiable patients), allocation of medical

records (and some retrieval of existing records), and appropriate patient tracking throughout the healthcare facility.

Disasters which leave our healthcare facilities still standing and operating can also have a huge impact on health information management. Following natural disasters such as flood, fire and extreme weather conditions, hospitals should have health information management plans in place that are adaptable and easily instigated when the Emergency Department (ED) starts to care for the high numbers of injured and distressed patients that may present for care.

Substantial numbers of patients seeking care during disasters will do so because of chronic medical conditions rather than trauma, due in part to the loss of personal medication supplies (their house may be destroyed, they may have to evacuate their house so quickly that they forget to pack their medications, or they may underestimate how long it will be until they can return to their homes), or due to damage or loss of access to their usual sources of primary medical care (Landesman 2001). General practitioners and pharmacies may not be in a position to open to the public or, depending on the extent of the disaster, may have themselves been damaged or destroyed.

This can pose a problem for the receiving healthcare facility if the patient, perhaps disorientated from the disaster, or confused due to pre-existing medical conditions, does not remember the type of medication they require, or even the medical problem for which the medication is required. One potential solution, if the patient had been treated at the hospital previously, would be accessing their medical record. The importance of an easily accessible hospital medical record will therefore be paramount.

However, if the patient does not have a pre-existing medical record, or it has been destroyed during the disaster, then a new one will need to be allocated. Close to one million people displaced by Hurricanes Katrina and Rita had destroyed medical records, making it difficult for clinicians to provide appropriate treatment or medication prescriptions following the disaster (Cadence Group 2005).

All of these patients will need to be allocated a new medical record, while there will also be

a large number of new records allocated to the minor and major trauma patients self presenting and being transported to the ED by ambulance. In addition, once the initial influx of patients injured during the acute phase of the disaster begins to subside, there can often be a steady presentation of patients who have been injured during rescue, evacuation or clean-up attempts.

This sudden increase in demand would obviously affect the ability of the Health Information Service (HIS) and, consequently, the hospital to identify patients appropriately and document individual patient care, if no pre-existing disaster plan was in place.

### Disaster plans

Disasters have key features of threat, urgency and uncertainty, which affect not only the victims themselves, but also the organisations that have to respond (Hodgkinson & Stewart 1991). Therefore, while the disaster itself is usually unexpected, many problems that will arise following a disaster can be expected and planned for in advance. Organisations that will have a role in managing the aftermath of a disaster (such as hospitals and healthcare facilities) should have a disaster plan in place which anticipates such expected problems and outlines activities vital for the coordination for response and recovery.

The disaster plan should detail appropriate responses and processes that will mitigate some of the problems that occur frequently, and predictably, in all types of disaster situations. However, the goal should be to have a contingency plan based on emergency preparedness and risk analysis, which can be implemented in the event of a problem: one plan that addresses every risk, rather than one plan that address all risks.

The disaster plan should incorporate a four-step approach:

- *prevention* – developed prior to disaster
- *emergency planning and risk analysis* – developed prior to disaster
- *disaster response* – activated when critical services cease to function
- *disaster recovery* – implemented to enable continuity of services.

Ongoing review and communication of the disaster plan through employee training and regular emergency drills is essential to facilitate

effective activation of the plan in a timely manner in the event of a disaster situation occurring.

As a vital department of any healthcare facility, the HIS should have a planned response should disaster strike. Problems that may be encountered by the HIS at a hospital or healthcare facility should be identified and responses that mitigate these problems should be discussed by staff and put into a disaster plan that can be activated in a timely manner within the HIS or Medical Record Department.

All HIS staff should know:

- where the disaster plan is located
- which staff members should be contacted
- emergency contact details for all staff members
- evacuation procedures for your department
- location of any disaster records in the hospital (where in the ED are they located?)
- how to access any electronic lists of patient details that exist.

#### **Standards for disaster medical records**

Standards Australia has guidelines for emergency medical recording systems (AS 4083, 1997). The standard states that 'all emergency services which would be involved in the response to a mass casualty incident should agree upon a standardised documentation procedure for casualties so that identification, diagnosis and treatment initiated can be effectively recorded' (Standards Association of Australia 1997). However, the standard has not been updated since 1997.

The National E-Health Transition Authority (NEHTA) recently completed a final report which investigates the possibility of implementing Shared Electronic Health Record (EHR) standards for Australia. In recognition of the potential barriers to 'achieving the goal of seamlessly shared structured, coded, machine-interpretable EHR information throughout the care chain', NEHTA describes the complexities of providing one standard for an array of differing clinical needs via many different types of transactions (National E-Health Transition Authority 2006).

Health Level Seven (HL7) is one of several American National Standards Institute (ANSI) accredited 'Standards Developing Organizations' (SDOs) that are currently supporting the development of portable, interoperable electronic health records for the hundreds of thousands of people

whose lives have been disrupted by Hurricane Katrina. Founded in 1987, HL7 is a non-profit group comprising volunteers who are dedicated to providing a comprehensive framework and standards for exchange, integration, sharing and retrieval of electronic health information that supports clinical practice and the management, delivery, and evaluation of health services. (For more information visit the HL7 website <<http://www.hl7.org/>>).

#### **The case for electronic disaster records**

The possible technologies for supporting patient medical records have changed dramatically over the last ten years, with healthcare facilities turning increasingly to computerisation of health-care information to assist in the management of patient care. Although paper-based records documenting healthcare notes and laboratory results are still the most common form of medical records, an increasing number of healthcare facilities are switching to, or considering the advantages, of electronic healthcare records. An electronic healthcare record is a repository of electronically maintained information about an individual's health status, medical history, and treatment. Electronic healthcare records can potentially be accessed by intra-hospital and inter-hospital computer networks, facilitating patient care and evidence-based decision making.

The lasting effects of Hurricane Katrina and Hurricane Rita powerfully demonstrate some of the advantages of electronic records. Many evacuees presented at hospitals needing treatment and some for surgery for cancer, heart disease, and kidney disease; treating these patients was incredibly difficult for the receiving hospitals, without their medical records containing X-rays, treatment plans, pathology results, diagnosis, or even a simple history. Other displaced people arrived at emergency shelters needing anti-retroviral drugs to control AIDS, or insulin to control diabetes, but often the patients did not know which drugs they were taking, or the quantity or frequency. Dr Daniel Z. Sands, a board member of the American Medical Informatics Association, observes:

Clearly, if records were stored appropriately and backed up on electronic media, this information would still be available. We wouldn't have

people trying to guess what their medications are or trying to figure out what kind of chemo they're getting or what phase of chemo they're in... There are medical records floating around in flood waters because people refuse to change to electronic records (quoted in Osterweil 2005).

With paper records scattered and floating throughout the Gulf Coast, drenched in polluted flood waters, healthcare providers were dependent on what patients were able to recall about their medical history, and had to start at the beginning, trying to piece together a patient's medical history. Add to this the obvious privacy issues that come with paper-based medical records floating in the streets, and clearly the hurricanes were the ultimate 'advertisement' for electronic healthcare records.

Such an 'advertisement' comes from New Orleans, underlining the important role electronic records play during disasters. During Hurricane Katrina, the New Orleans Veterans' Affairs (VA) Medical Centre flooded. However, electronic medical records for 50,000 patients of that hospital and surrounding veterans' outpatient clinics survived and are now available to any VA physician at any VA hospital nationwide (Cadence Group 2005).

On 1 September, a Department of Veterans Affairs computer specialist was flown from New Orleans carrying backup tapes of all the records, which had been re-entered into computers in Houston by the next night (Cadence Group 2005). Francois de Brantes, health care initiatives program leader for General Electric's Corporate Health Care and Medical Services, stated: 'It took the VA about 100 hours to transfer electronic health records for all its patients in the South, while it will take thousands of hours for the private sector to reconstitute paper medical records' (Cadence Group 2005).

While the development of electronic health records is a priority for governments in many countries, including Australia, the number of hospitals to implement electronic health record systems is still small. Only 20-25% of hospitals in the United States have adopted some version of an electronic health record, despite it being considered the best way to preserve and

distribute medical records in a disaster scenario (Optio Healthcare 2005).

A number of Australian hospitals are currently moving towards an electronically-based HIS, but at the start of 2006, no Australian hospital utilises a fully electronic HIS. In London, Britain's National Health Service - *NHS Connecting for Health* has launched a major electronic data initiative, in the National Programme for IT (Npfit) to bring modern computer systems into the NHS which will improve patient care and services. Over the next ten years, the National Programme for IT will connect over 30,000 GPs in England to almost 300 hospitals and give patients access to their personal health and care information, transforming the way the NHS works (NHS Connecting for Health 2006a).

The NHS Care Record Guarantee sets out the rules that will govern information held in the NHS Care Records Service including 'people's access to their own records, controls on others' access, how access will be monitored and policed, options people have to further limit access, access in an emergency, and what happens when someone cannot make decisions for themselves' (NHS Connecting for Health 2006b).

While collective interest and collaboration continues to evolve HL7 and other healthcare subject matter with experts and information scientists, possibilities for creating an exchangeable electronic standard to suit the EHR may emerge in the not too distant future.

### ***What should health information services be doing now to prepare for disaster?***

It does not take only a hurricane or building collapse to destroy medical records; this can occur as a result of fire, flood, broken pipes, or extreme weather (Cadence Group 2005). There is no sense in only planning for disasters which 'might happen'. It is necessary to be prepared for any type of disaster that may possibly impact on the ability of the facility to provide optimum patient healthcare.

There are seven things that facilities can review and consider *now* in preparation for any disaster:

1. *Conduct a 'needs assessment'*. These can be conducted by external, objective personnel. However, they can also be conducted by you

and your staff. You should know what your current procedures are and how these would cope during a range of disasters. Do you have a separate allocation of 'disaster' records located somewhere else in the hospital (such as in the ED)? Which staff members would be recalled in the event of an emergency? Are their emergency contact numbers current? It may be useful to do some desk-top scenarios to see how your department would continue operating and providing a service.

2. *Develop an electronic list of patient ID, medications, allergies and immunisations.* While this could be difficult for larger hospitals to manage, smaller hospitals that utilise paper-based records could do this; it should be a priority for hospitals with no back-up systems. If your records are destroyed by flood or fire, for example, these details could be crucial in providing life-saving care to your patients.
3. *Consider converting to electronic records.* Look into the feasibility and cost of converting vital records to electronic format. You may need external advice from a records management professional.
4. *Prevent damage to your paper-based records.* Prevent water and heat damage. Do not store records near water pipes or air conditioning. Never store records near a heat source. Control the climate in the area where records are stored and avoid light damage. Store records away from natural and ultraviolet light sources. Paper is fragile and can easily be damaged by light, heat, and moisture in the air (Cadence Group 2005).
5. *Back up computer files.* This is perhaps an obvious activity to highlight but surprisingly it is frequently done poorly or overlooked. Your facility should establish a schedule for backing up critical computer files frequently, and all files periodically. Consult best practices in your industry for recommended frequencies. Store backup files in a secure offsite facility (Cadence Group 2005).
6. *Plan for the potential loss of information technology infrastructure.* Disasters may potentially damage or destroy existing information technology infrastructure and networks. This problem will be significantly more important to address if your hospital

utilises electronic records. Back up systems, including back up files and back up system applications need to be addressed in disaster plans for health information services and hospitals, and should be tested frequently (or as often as instructed in the disaster plan).

7. *Develop an HIS disaster plan.* If your HIS does not have a disaster plan, based on a needs assessment and in recognition of the potential problems associated with both paper-based and electronic health care records, one should be developed by the HIS team and tested regularly to ensure that all aspects of the HIS functions are covered.

### **Does your hospital use a paper-based health record system?**

Despite a general consensus on the benefits of electronic records, the prospect of having all Australian hospitals converted to a fully electronic health record system in the near future is unlikely. For the majority of Australian hospitals that currently use paper-based health record systems, in addition to the seven activities outlined above, particular consideration should be given to storage and preservation of records.

The State Records Office of New South Wales (2000) provides a fully comprehensive standard for records storage and preservation methods (including protection from disaster).

The following seven principles are considered within the standard and may similarly be applied to the preservation of health records:

1. *Location.* Sites for records storage should be located away from known hazards.
2. *Environmental control.* Records should be stored in environmental conditions that are appropriate to their format and retention period.
3. *Shelving and packaging.* The shelving, equipment and containers for records storage should ensure that records are secure, accessible and protected from deterioration.
4. *Protection from disaster.* Disaster management programs should be established and maintained to ensure that risks to records are either removed or managed appropriately.
5. *Maintenance.* Programs for the maintenance and monitoring of records and storage areas should be implemented.

6. *Careful handling*. The retrieval and use of records in storage should be subject to controls in order to prevent damage and deterioration.
7. *Accessibility*. Records should be stored in facilities where they can be identified, located and retrieved easily.

In addition to considering storage and preservation of paper-based health care records, the HIS team should also give consideration to methods of destruction of damaged medical records. A disaster may result in water or smoke damage to records, leaving important patient information irretrievable. In addition, as seen during the hurricanes in the USA in 2005, flooding can cause important health records to be left floating unsecured throughout the hospital, and even out in the streets. Careful consideration needs to be given as to how these records will be managed, and destruction procedures (based on local regulations and broader hospital policies) should be documented in the disaster plan.

## Conclusion

When people are displaced by disasters, it can be difficult to provide medical care without the information that is normally available from their healthcare provider. However, the disaster itself may have damaged or destroyed existing medical records, making it very difficult to access vital patient information such as medications, allergies, diagnosis and immunisations; all are essential for maintaining optimum patient care. Health information disaster plans should not only be in place in all healthcare facilities, but should be regularly tested and updated.

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