

Managing health information during disasters: a survey of current specialised health information systems in Victorian hospitals

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Abstract

It can be predicted that a substantial number of patients will seek medical care during a possible disaster, placing an increased strain on hospital resources, including health information services. With medical records playing a vital role in the identification of patients and documentation of patient care, the ability of the health information system to cope with this projected surge in demand needs to be addressed. This study was designed to investigate the expected use of specialised health information systems for disasters in Victorian hospitals during such contingencies. Specifically, this study investigated what type of specialised systems hospitals had in place at the time and whether a standard for specialised health information systems for disasters was needed. While 79% of responding hospitals reported having a specialised health information system for disasters, 91% of all responding hospitals reported that specialised health information systems for disasters were necessary. All specialised systems were paper-based, and 94% were based on the standard medical record format and content. Finally, 64% of hospitals believed that a Standard for specialised disaster medical records should be developed.

Keywords (MeSH)

Disaster Planning; Medical Records; Hospital Information Systems; Medical Records Department; Standards; Victoria

Introduction

During a disaster a substantial number of patients will seek medical care, including those injured during the acute phase of the event, those injured in recovery and evacuation attempts, and the chronically ill who may have limited access to medications and medical equipment (Smith & Macdonald 2006). This surge in demand on the healthcare system will result in an increased strain on the resources of the hospital. In the first instance, the surge capacity of the emergency department (ED) will be tested, with a subsequent surge in demand on the resources and services of the health information service (HIS), namely an increased demand for new medical records, and identification and retrieval of existing ones.

Recent international experience, ranging from terrorism ('September 11', Bali, London, and

Madrid bombings), to bio-terrorism (anthrax), and natural disasters (hurricanes, cyclones, earthquakes, emerging infectious diseases), has highlighted that, regardless of the type of disaster, 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 new medical records or retrieval of existing records, and appropriate patient tracking throughout the healthcare facility. This sudden increase in demand would have an impact upon the ability of the HIS, and consequently the hospital, to appropriately identify patients and document individual patient care. It also raises the question whether existing health information systems would cope with a disaster, or whether specialised health information systems are required.

A 1993 study of public hospitals in Victoria (Buchanan 1993) investigated whether existing health information management systems utilised specialised disaster medical records, or had contingency plans for disasters (such as pre-allocated medical record numbers to be activated in the event of a disaster, or an allocated set of pre-made paper-based medical records). Despite the fact that the majority of respondents considered the development and implementation of specialised disaster medical record systems to be necessary, the majority of those hospitals did not utilise specialised records at that time.

With the incidence of disasters increasing both internationally and nationally, the development of appropriate measures for the management of patient information during a time of surges in demand has become a priority for hospitals and their health information services worldwide. A comprehensive search of the existing international literature addressing specialised health information systems and medical records for disasters identified a number of studies that investigated some aspect of identifying and triaging patients during disaster situations (DeMars, Buss & Cleland 1980; Milholland, Cowley & Panos 1981; Barton & Bodiwala 1991; Noordegraaf et al. 1996; Nocera & Garner 1999; Otomo et al., cited in Shinchin 2003; Garner 2003). These studies focused predominantly on the identification and management of patients in the pre-hospital phase of disaster care.

A 2003 study by Shinchin (2003) proposed a model for medical records for disaster relief operations. Shinchin suggested that the medical record format currently used during routine patient care is not adequate for use during a disaster, being too complicated, cumbersome, and difficult to use. The use of 'field' or pre-hospital triage tags for use in the hospital environment has also been considered; however, these tags were considered to be too simple, with very limited space within which to document patient care (Shinchin 2003, Otomo et al., cited in Shinchin 2003). Disaster medical records need to be large enough to enable adequate documentation of patient care under the stress of an incident where writing typically becomes larger and less legible (Coupland, Parker & Gray 1992).

The disaster medical record proposed by Shinchin uses only one double-sided sheet of paper, consisting of a range of 'check box' options where healthcare professionals can simply circle diagnosis, clinical details, and laboratory requests. This type of disaster medical record has a number of advantages, including its simplicity and ease of use, and is inexpensive to produce.

This study investigated whether Victorian hospitals (both public and private) with emergency departments (EDs) have specialised health information systems or medical records that would be implemented during disasters. Furthermore, it investigated what type of specialised systems hospitals used, how they would be activated, and by whom. Finally, this study asked responding hospitals to indicate whether a standard for specialised health information systems for disasters was needed.

Method

Study participants

All Victorian hospitals with an ED were eligible for inclusion in the study because it was hypothesised that following a disaster the majority of patients would self-present, or be transported by ambulance, to a hospital with an ED. Victorian hospitals with an ED were identified using resources that were publicly available from the Victorian Department of Human Services (DHS) (<www.dhs.vic.gov.au>). A list of eligible hospitals was developed using information available on the DHS website and in a DHS document, *Public Hospitals and Mental Health Services: Policy and Funding Guidelines 2005-06 Non-Admitted Emergency Services Grant – Appendix 4* (Department of Human Services Victoria 2005). Where the profile of a private hospital (i.e. whether it had an ED) was uncertain, a member of the research team contacted the hospital to confirm that they had a funded ED. No private hospital profiles were found to differ from the listing in the policy and funding guidelines on the DHS website.

A total of 45 Victorian hospitals (38 public and 7 private) were determined to be eligible for inclusion in the study. Each of these 45 hospitals was placed on a mailing list and a

survey addressed to the Chief Health Information Manager was sent to each hospital. The Chief Health Information Manager or a HIS staff member responded to the survey.

Survey

The survey developed for this study was based on the 1993 survey used by Buchanan (1993) and was designed to assess whether specialised health information systems were used, in what format, how they were activated and by whom, where the systems were located, how training and testing of the system was conducted, and whether the respondents felt that a specialised system and a standard for such a system was needed.

The survey was comprised of two parts, each utilising a series of closed questions (yes/no and tick box format). Respondents were also invited to respond to a series of open-ended questions at the end of the structured questions in both Part A and Part B.

Part A was to be completed by all hospitals. In this section of the survey, respondents indicated if their hospital was public or private, and whether the hospital used a specialised health information system for disasters. Respondents were also asked if they felt that a specialised health information system for disasters was necessary, if a Victorian standard for such a health information system was necessary, and whether the system should be paper-based or electronic.

Part B was completed by hospitals who reported that they used a specialised health information system for disasters. Respondents were asked to describe the type of system used, when it was established, the last time (if at all) it had been utilised, where it was located, whether the system had been tested, how training was conducted, and how frequently training and testing were conducted.

Mail out

The survey, an explanatory statement, and a postage-paid return envelope were sent to each eligible Victorian hospital. A reminder was sent out to all hospitals two weeks after the initial mail out. Ethics approval was sought and obtained from the relevant research governance body, and all survey material was de-identified and confidential.

Data analysis

The surveys were reviewed by three members of the research team, and data was extracted and managed using the statistical management program SPSS (Version 14). Open-ended responses were analysed by three members of the research team to identify recurring themes and salient issues.

Results

Study participants

Of the 45 hospitals that received a survey, 33 (74%) completed and returned the survey. Of these 33 hospitals, 29 (88%) were self reported as public facilities, and three (9%) as private. One respondent failed to complete this survey question.

Standard health information systems

Just over half (55%) of the responding hospitals utilised a paper-based standard health information system. The remaining 45% of hospitals use a combination of paper-based and electronic systems. The electronic files included in the medical record were pathology and radiological reports. No respondents reported using a wholly electronic system for existing standard medical records.

Specialised health information systems for disasters

Of the 33 responding hospitals, 26 (79%) reported having a specialised health information system for disasters. All of these systems were paper-based and only two of the 26 specialised systems (8%) utilised a medical record with a different format or content to the standard medical record.

The majority (96%) of these specialised health information systems utilised different Unit Record (UR) generation procedures and 94% of systems were stored in locations outside of the HIS.

It is interesting to note that while 79% of responding hospitals reported having specialised health information system for disasters, 91% of all responding hospitals reported that specialised health information systems for disasters were necessary.

Hospitals who reported that they did not utilise a specialised health information system during disasters were asked to indicate the reason for this decision. The main reasons cited by respondents were the perception that the probability of an ED having to treat victims of a disaster in Victoria was low, and that the standard medical record is suitable for use in all situations. Approximately half of the hospitals without a specialised system in place for disasters reported that alternative systems had never been considered.

All hospitals were asked what format they considered a specialised health information system for disasters should be. Respondents believed that specialised systems should be familiar, robust, and portable:

Specialised disaster records should not differ greatly from standard records in use at the hospital – familiarity with forms/layout would... (make the) system more efficient – or we should have a state-wide system with appropriate training.

Hospitals should utilise the same sort of records in a specialised system as in the standard system to avoid confusion in times of panic.

Specialised records should reflect the current hospital's system (paper-based versus electronic).

The majority of respondents (48%) believed that specialised systems should be paper-based:

Indications from Royal Darwin Hospital during the Bali Bombings were that paper-based information collection was the only way to collect (patient) information quickly enough. It is always going to be easier to grab a piece of paper and collect patient information than access a computer during a disaster.

A combined paper-based/electronic system was the preferred format of 33% of respondents:

Initial paper-based records could be electronically backed up to support multiple users accessing patient information throughout the hospital.

As with our standard health information management system, disaster systems should consist of paper-based records so they are portable and quickly available and electronic path lab and radiological reports.

Only 16% of respondents believed that a specialised health information system for disasters should be entirely electronic:

During a disaster, it is going to be harder to locate a paper-based record than one that is available electronically. Especially in terms of patient tracking throughout the hospital...with so many patients surging on the facility, it would be easy for a paper record to get lost in the commotion.

Standards for the development of specialised medical records for disasters

The majority of respondents (64%) believed that a Victorian Standard for specialised disaster medical records should be developed. Nine of the 33 hospitals (27%) did not believe a standard was necessary, and three (9%) did not answer this question. Three of the nine hospitals that did not support the development of a Victorian Standard commented that hospitals did not need standards for managing patients during a disaster, as the standard medical record and health information system procedures would be adequate during a disaster situation.

The survey indicated that the lack of a Victorian Standard or published guidelines had contributed to the situation where two hospitals failed to develop and implement a specialised system for disasters. When hospitals were asked to indicate the reasons for not having specialised health information systems for disasters, these two hospitals reported that they had considered developing a specialised system (and thought that such a system was necessary), but due to the lack of available guidelines, a specialised system had not been developed.

For how long had hospitals been using specialised systems?

Just over half (56%) of the responding hospitals reported that the specialised system had been in place for more than ten years, 22% less than ten years, and 22% did not know when the system had been implemented.

Storage of specialised health information systems

The most common storage area for the specialised disaster medical record was in the ED, with 89% of hospitals storing the specialised disaster

records there. Two hospitals reported that the disaster medical records were stored in both the ED and the HIS. No hospital reported storing the disaster medical records in the HIS alone. One hospital reported storing the records in the outpatient department, and one hospital nominated a 'disaster control centre office' as the storage area.

Training in the specialised health information system for disasters

Training of HIS staff in the specialised system was most frequently conducted on commencement of employment (89%), followed by training by ED staff or during ED disaster exercises (24%). A further 7% of hospitals did not conduct any training in the specialised system.

When is the specialised health information system activated?

The majority of respondents reported that the specialised health information system would be activated when the hospital is notified of a disaster and the Senior Medical Officer in the ED activates the use of specialised disaster medical records. Triage nursing staff, HIS staff, and dedicated Disaster Coordinators were also reported as having the responsibility of activating the system.

When was the specialised health information system last used?

Hospitals were asked to indicate the last time that the specialised system had been activated. The majority of respondents (44%) reported that it had 'never' been used, 33% had activated the system in the last two years, one hospital had activated the system in the last ten years, and two hospitals were unsure as to when the system was last used.

Discussion

The majority of Victorian hospitals in both the 1993 (Buchanan 2003) and 2006 surveys reported either the *use* of a specialised health information system for disasters, or the *need* for one. As in 1993, the number of hospitals who reported that a specialised health information system for disasters was necessary was greater than the number of hospitals who have actually implemented a system. This indicates that the

number of Victorian hospitals that could adopt a specialised system for disasters could be increased.

It is important therefore to take note of the reasons given by hospitals for not having a specialised system in place. The main reason cited for not having a specialised health information system for disasters was the same in 1993 and 2006; a belief that the standard medical record was adequate for use in all situations. A common theme among the survey responses was that unfamiliarity should be avoided during a disaster situation, and that the use of new forms or systems could be confusing and ultimately time-expensive.

The majority of Victorian hospitals' specialised systems are, however, based on the familiar medical record format and content, with the majority utilising their standard medical record forms in the system. The specialised disaster systems, however, adopt more timely strategies for procedures such as UR allocation, record generation and record retrieval. Therefore, while the standard medical record *format* may be adequate for use during disasters, the *systems* surrounding medical record generation and retrieval may not be.

The capabilities of these systems will be their most tested feature during a disaster situation, when the number of patients requiring new medical records, and potentially medical record retrieval, will increase suddenly. It is vital therefore that the HIS has a plan for dealing with such a surge of demand, to avoid any detrimental effects on individual patient care.

Buchanan (1993) found that 81.6% of responding Victorian hospitals in 1993 had some form of contingency plan for disasters (most commonly the existence of alternative UR generation systems or location of paper-based records). In 2006, 96% of responding hospitals reported the existence of such contingency plans. This trend is encouraging, especially in light of the continued impact of disasters on populations internationally, however, the perception of a number of hospitals that they will be unlikely to experience a disaster situation, and consequently have not considered a specialised system, is a concern.

The number of hospitals who believe a Victorian Standard for specialised disaster medical records is needed has increased from 47% in 1993 (Buchanan 1993) to 64% in 2006. This change is reflective of the move at the State level in Victoria to adopt a standardised approach to hospital-based disaster preparedness. In 2006, the Victorian DHS funded an emergency management working group to develop a standard 'template' for hospital Code Brown (Disaster) Plans throughout Victoria. All Victorian hospitals were represented on the working group, and the ensuing drafted plan is currently being reviewed by the DHS.

While the management of medical records was not specifically addressed in the draft plan, the issues of patient identification and patient tracking were identified as key concerns. The plan also provides guidelines for the establishment of an Emergency Operations Centre (EOC). The EOC in each hospital would be a potential permanent location for a back-up health information system for disasters, or to store pre-assembled medical records for disaster situations.

A Victorian Standard on health information systems for disasters could be a partner document to the DHS template, ensuring that hospitals have effective disaster preparedness plans which address all of the required activities of disaster response.

Conclusions

While the number of responding hospitals reporting the use of a specialised health information system for disasters is encouraging, there are still a number of hospitals who reported that such a system was necessary, but had not adopted one. With a large number of hospitals supporting the development of a Victorian Standard for specialised disaster medical records and health information systems, such a Standard may potentially result in more hospitals implementing contingency plans for disaster situations, such as alternative medical record and UR generation procedures, and storage of pre-designated 'disaster records'.

Concerns regarding the *unfamiliarity* of specialised medical records should not deter hospitals from developing specialised health information systems for disasters. Appropriate staff training and system testing would enhance familiarity and confidence in the system, resulting in a more responsive health information system during disaster situations.

With the number of disasters continuing to increase worldwide, and with potentially billions of people being affected by them and consequently requiring some form of health or medical care, it cannot be assumed that Victorian hospitals will not be forever immune to the impact of disasters. The time to plan, prepare, and mitigate is now. Making simple changes to existing systems, and utilising standard forms in a more efficient and effective manner can make a big difference in times of surges in demand.

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