Challenges of the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes: a qualitative analysis

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**Abstract**

**Background** Disasters are a growing global phenomenon. New Zealand has suffered several major disasters in recent times. The state of healthcare disaster preparedness in New Zealand prior to the Canterbury earthquakes is not well documented.

**Objective** To investigate the challenges of the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes.

**Method** Semi-structured interviews with emergency planners in all the District Health Boards (DHBs) in New Zealand in the period between January and March 2010. The interview protocol revolved around the domains of emergency planning adopted by the World Health Organization.

**Results** Seventeen interviews were conducted. The main themes included disinterest of clinical personnel in emergency planning, the need for communication backup, the integration of private services in disaster preparedness, the value of volunteers, the requirement for regular disaster training, and the need to enhance surge capability of the New Zealand healthcare system to respond to disasters.

**Conclusion** Prior to the Canterbury earthquakes, healthcare disaster preparedness faced multiple challenges. Despite these challenges, New Zealand’s healthcare response was adequate. Future preparedness has to consider the lessons learnt from the 2011 earthquakes to improve healthcare disaster planning in New Zealand.

Disasters are part of human lives. Global disasters are increasing in frequency, severity and damage. In the last 50 years, more than 10,000 disasters have been reported that collectively affected more than five billion humans. According to the Center for Research Epidemiology of Disasters (CRED) and the United States Office of Foreign Disaster Assistance (OFDA) database, the death toll from disasters in the last 50 years is estimated to be in excess of 12 million people. This pattern is multifactorial and is mainly due to three global changes that are connected: global over-population, urbanisation and industrialisation, and climate changes.

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to meet the healthcare needs arising from a disaster is integral to minimising the human impacts of such events.

Healthcare disaster preparedness operates at two main levels: strategic and operational. The strategic level oversees the process of disaster preparedness and its activities from a wider perspective such as formulating generic emergency plans, securing funds for disaster preparedness, controlling emergency communication and training. Moreover, strategic planning draws on national guidelines and frameworks for emergency response and is usually carried out by emergency planners (EPs).

On the other hand, the operational arm of disaster preparedness focuses primarily on the actual disaster response measures such as command and control, triage and clinical management of victims. Hence, all emergency response agencies constitute the operational sector of disaster planning. This includes pre-hospital healthcare services such as ambulance services and hospital-based services such as trauma services. In short, the core function of the operational arm is to execute strategic planning in the provision of disaster health care.

Most District Health Boards (DHBs) in New Zealand have a designated EP, or equivalent, with a primary role of strategic disaster preparedness planning that integrates the overall Coordinated Incident Management System (CIMS) which is the national framework for disaster planning. Several regional emergency advisors who are appointed by the Ministry of Health support the DHB emergency planners in their roles.

Information on the state of healthcare disaster planning in New Zealand is scarce and fragmented. The value of healthcare disaster preparedness was highlighted by the Canterbury earthquakes. The earthquake injured 6657 and killed 182 in the first 24 hours. The majority of injuries were minor musculoskeletal which did not require hospital-level care. Ardagh and colleagues highlighted the lessons learned from the initial response to the event.

One of the key massages in their paper was that rehearsed preparedness plans have helped to reduce the mortality and morbidity from the Canterbury earthquakes. Unfortunately, the 2012 Royal Commission of Inquiry into the Canterbury Earthquakes did not address the overall healthcare response.

This article assesses the challenges of healthcare disaster preparedness that exist in New Zealand prior to the Canterbury earthquakes. Such challenges influenced the New Zealand healthcare care preparedness before the Canterbury earthquakes.

Methods:

Qualitative key informant interviews were undertaken to assess the challenges facing healthcare disaster preparedness in New Zealand. Such a method has been widely used and validated in disaster medicine research. The interview protocol addressed the main components of healthcare emergency preparedness as described by the World Health Organization which includes: planning and policies, communication, collaboration and coordination, training, volunteers and the public, and surge capability. These domains are internationally regarded as the core pillars for emergency preparedness.

The key informants were EPs from the 21 District Health Boards (DHBs) in New Zealand. All EPs were mailed the interview protocol and an invitation letter to participate in a phone interview to discuss the state of healthcare emergency preparedness. A follow up email was sent to all non-responders 2 weeks after the initial invitation. Sixteen DHBs (including Canterbury District Health Board) agreed to...
participate in the research. The participating DHB represent 79.9% of the New Zealand population. Eleven phone interviews were conducted between January and March 2010.

Five DHBs responded to the interview questions in writing. An additional interview was conducted with a pre-hospital provider. Interview transcripts were sent back to interviewees for approval and editing. Participants were encouraged to add their comments after editing the transcripts. The average length of the phone interviews was 31:04 minutes (range; 19:34 min–55:34 min). The total free text used in this paper was 66 pages of transcripts and comments.

The Ministry of Health multi-region ethics committee approved the study. Individual written consents were obtained from all interviewees prior to the interviews.

The analysis of the qualitative data collected followed an inductive and interpretive process in order to understand the state and challenges of strategic emergency preparedness. Inductive and interpretive methods are validated approaches in disaster literature and appropriate in determining the experiences of participants about a particular issue in this case, strategic healthcare emergency preparedness.11

The six core domains were the axial framework for this study and the analysis aimed to extract the issues stemming from each domain. Ideas emerging from each domain were considered themes after three rounds of data analysis in which saturation was believed to have been reached. The analysis was conducted with the aid of the qualitative data analysis package NVivo 8© (for Microsoft XP, QSR International Pty Ltd, USA).

Results and discussion

The World Health Organization’s domains of healthcare emergency preparedness provide a valuable framework for investigating the challenges of New Zealand disaster preparedness. This section presents the main challenges of New Zealand emergency preparedness as identified by emergency planners in each of the emergency preparedness domains described by the WHO.

Planning and policies

Struggle to ensure clinical “buy-in”—One of the changes in healthcare system in the 1990s is the establishment of the “Emergency Planner” as a separate job under the Emergency Enhancement Fund.14 This has led clinicians and frontline personnel to disengage in healthcare preparedness activities. Participants felt that the majority of healthcare providers view the emergency planning process as being “someone else’s job” rather than part of their clinical duty. EPs come from a variety of clinical and non-clinical backgrounds including, medicine, nursing, economics, marketing, and civil defence.

Interviewees reported a silo attitude among healthcare providers who resist participating in clinical emergency planning activities run by EPs who -in most cases- have no clinical background. This culture is enforced by the nature of individualized healthcare provision. The medical disaster response requires a shift to population-focused healthcare provision.

One of the biggest challenges expressed by EPs in New Zealand is getting the “mind-shift” among healthcare providers that disaster situations are unique. EPs felt that the silo culture in many health services undermine disaster preparedness. For instance, EPs observed that many doctors feel frustrated at not being the commanders during a disaster response.
Furthermore, they felt that most healthcare services operate in fragmented “silos” during normal operation; hence, it is hard to imagine this culture will change during a disaster response.

Two emergency managers reflected on this:

“We don’t really have much buy-in from clinicians and they have a lot of resistance to what we do simply because we are not viewed as part of a clinical team and they are not interested, have too much to do, or can’t be bothered to play silly games”. (NZEM.1)

“I think there is a bit of a dilemma in health, where I think doctors and nurses believe they should be running everything during an emergency when in fact they are not well positioned to do that. They are positioned and skilled in looking after patients and should focus on that.” (NZEM.12)

“I think, traditionally, doctors have ruled the roost, and they find it hard to let go. And in a crisis, thinking an administrator might have to be the incident controller is a bit foreign to them. That is not demeaning them at all; I think it is a fact of life you know. So what we are trying to do here is effectively initiate a bit of culture change.” (NZEM.10)

Attracting frontline healthcare providers to participate in the process of emergency preparedness is a struggle for emergency planners in New Zealand. Furthermore, attitudes of clinical providers about disaster preparedness appear to be a barrier to emergency planning.

**Beyond the response phase**—Disasters vary considerably and some can be protracted. A living example is the Christchurch earthquake situation that started in September 2010 and the devastation is still affecting individuals today. Emergency Planners felt that healthcare emergency planning lacks the foresight for the long-term impacts of disasters especially the psychological effects. An EP reflected:

“To be honest, long term effects of emergencies are badly dealt with in our current planning. We tend to focus on the first three days and then it seems that we are scared to think what will happen beyond. Disasters go on for long time and we need more work on this aspect.” (NZEM.1)

Disaster response is the phase of the emergency that attracts the media most and therefore the public attention focuses on the initial phase more than the recovery phase. It is important to ensure that disaster planning covers all phases of the emergency from prevention to recovery.

**Communication:**

Lessons from international disasters have shown that communication is often the single point of failure. Communication errors can be categorized into failure to pass information, failure to confirm information, or failure to coordinate information. An example of a failure to pass information was demonstrated during attacks of 9/11 when the command centre failed to pass on critical information to receiving hospitals and the first indication of a disaster was initiated by the arrival of wounded victims to multiple emergency departments.

New Zealand’s EPs felt that, at a national level, there was a good emphasis on disaster communication. They reported that the current national communication structure is robust and reliable. The MoH provides senior DHB managers with special training on risk and disaster communication.

Furthermore, the MoH has provided each DHB with several satellite-based communication devices to only be used during mass emergencies and when traditional telephone-based communication fails. Nevertheless, EPs expressed a
concern about the availability of backup facilities available when such communication methods fail.

Emergency managers also believed that the over-reliance on an almost fully computerized Information Technology (IT) system has the potential to create problems during disasters, as one emergency planner elaborated:

“In disaster situations, if you over-rely on technology you could create a disaster. That is why we have paper records as backups to our digital records so if the power or IT system is out, we can easily go back to paper records and keep going.” (NZEM.9)

Many emergency planners felt that the ability to revert back to paper based-records is essential and DHBs should run a dual system of electronic and paper-based medical records. Therefore, communication is a pressing challenge to healthcare disaster preparedness in New Zealand.

**Collaboration and coordination:**

Interviewees reported that the level of collaboration between public healthcare services in New Zealand is adequate. Despite strong collaboration between DHBs several participants reported that the collaboration of public healthcare services with private services is lagging behind.

Few DHBs have signed MoUs with private health or non-health services. All emergency managers interviewed expressed the need to collaborate more with private healthcare services such as pharmacies as they have valuable human and physical resources that can be utilized for disasters. An EP explained:

“Our relationship with the private sector is not as (strong) as we would like (it to be). Our goals for this year are to establish a number of contracts sort of Service Level Agreements with the private sector that will support health care in our community during an incident or disaster.” (NZEM.8)

Interviewees reported that one of the drawbacks of the current CIMS structure is the lack of explicit private services representation in disaster preparedness. An EP stated:

“I think the private sector, health or otherwise must be represented in the overall CIMS structure. They can contribute a lot to disaster response. I give you an example, if our hospital is munted in a disaster the only self-sustaining place we can locate to is the local airport. That is why we should collaborate with airport authorities and other private authorities. This has to be stated in the CIMS structure.” (NZEM.12)

Collaboration in a disaster response can augment resources and avoid duplication of roles of all public and private agencies. Hurricane Katrina was a scenario in which the private agencies contributed immensely to the disaster response. It was estimated that the pharmaceutical companies provided about US $25 million in funds for nutritional and medicinal products.\(^{19}\)

Early reports indicate that the private sector has contributed almost NZ $100 million for Christchurch rebuilds.\(^{20}\) Therefore, the private sector has the capability to provide valuable resources during disasters. Emergency planners should always consider private agencies and their role in emergencies should be clearly stated in the national framework.
Disaster training

The current New Zealand MoH funding for DHBs covers training workshops for all healthcare providers. The training is nationally consistent and revolves around teaching different levels of the CIMS structure. The training also includes regular drills and exercises.

The frequency and extent of such exercises varies between DHBs from one tabletop exercise every two years to a couple of victim-simulated drills per year. In addition, civil defence and fire services run several drills every year and some hospital services participate in such exercises, especially emergency departments.

As discussed earlier, the buy-in from healthcare providers for disaster planning was felt to be limited. Interviewees reported that some medical personnel view training for disasters as “playing silly games.”

Participants felt that one method of attracting healthcare providers to actively participate in disaster planning is to use modern simulation programs that are more “fun” and educational at the same time. One widely available program in New Zealand is Emergo Train© which all DHBs have trained some staff and senior managers to use as a teaching tool. An EP stated:

“I guess education is the other thing, which is a key to everything really. The more you get out there, the more you share the plans, and talk about them. So making education more attractive because it can be a bit unsexy and boring. It is a matter of finding how to excite people and talk about the things that interest them. And if you can do that then, they tend to actually retain stuff. We have tried Emergo and clinical staff enjoyed the experience” (NZEM.16)

Internationally, the number of disaster training programs available for health providers increased substantially since 11 September 2001.21 The multitude of programs raises the question of how effective such training activities are in enhancing disaster preparedness of healthcare providers.

A systematic review by Williams and colleagues in 2008 concluded that there was no sufficient scientific evidence to determine whether training interventions for healthcare providers are effective in enhancing knowledge and skills in disaster response.22 This is a reflection of the lack of rigorous evaluation programs and the heterogeneity of the modalities used in disaster training.

The majority of disaster training value is based on “lessons learned” from international disasters rather than evidence-based.23

Volunteers and the public

The interviewees believed that there is a need to focus on the wellbeing of emergency responders. Many EPs felt that there was little written down on how to look after “own warriors” and the welfare of emergency responders is critical in any successful response. An EP said:

“This area needs allot of work. At present, we rely on staff themselves to make appropriate arrangements that their families are looked after before responding. At the moment the disaster response equation, sadly, does not really factor in staff-wellbeing issues.”(NZEM.13)

Furthermore, volunteerism provides the community with a sense of involvement and ownership of the disaster response. Yet, a clinical risk manager highlighted New Zealand’s lack of preparedness to harness volunteers:
“Currently, we have no clear lines on how to utilise healthcare volunteers and as per this DHB we don’t ask non-employees to assist. If this was to happen we will have to figure out a credentialing guideline and process.” (NZEM.11)

Therefore, volunteers are a part of any disaster response and they require advanced planning in order to harden their full potential.

**Surge capability**

Emergency Planners felt that it is essential when responding to a surge from a disaster to ensure the basics of health needs such as to availability of clean water, appropriate sanitation measures, enough food, and safe shelter. EPs were concerned that the current understanding of healthcare surge capability still focuses on the excess of beds that can be freed up and the extra ventilators available during a disaster rather than the basics. An EP admitted:

“We largely use surge capability and beds availability interchangeably. In our DHB we can usually, quickly free up 80 beds in ........ hospital to accommodate casualties. Our chief medical officer thinks that in a serious event that number may be closer to 200 beds.” (NZEM.12)

EPs in NZ recognized that “staffing” is the main limiting component in medical surge capability. Two emergency managers discussed staffing in surge capability:

“Staffing is the key factor in surge. I mean you can lay people wherever you like but you need someone to look after them.” (NZEM.2)

“We had a recent mass casualty exercise and to the surprise of all of us we could manage to have 100 beds where patients can be put in, but we just realised that we don’t have the human resources to look after those 100 patients. So to be honest, you would be able to make do with fewer beds but you can’t do with less staff in a disaster.” (NZEM.8)

The recommendation from the international task force for mass critical care summit set the benchmark of surge capacity to be at 300% of the average patient load. Such high expectations seem unrealistic in the New Zealand context because such patient loads requires physical and manpower resources that simply are not available.24

The Australasian Surge Strategy Working group produced 22 domains of surge capacity in emergency departments that are relevant to the Australasian context.25 Such documents are essential in planning and preparedness. It is important to appreciate that surge for infrastructure is critical in order to provide a safe and capable environment for disaster responders to work in.

Strategies such as halting or reducing elective surgeries and outpatient clinics are essential in healthcare disaster response surge capacity. District Health Boards have to develop advanced plans on how to execute such measures to ensure that the health needs of disaster victims and regular patients are not compromised.

**Conclusion**

New Zealand healthcare disaster preparedness was tested by the Canterbury earthquakes. This research showed that disaster preparedness in New Zealand faces several challenges prior to the Canterbury earthquakes. Several of challenges presented in this paper were also identified by Ardagh and colleagues in their review of the initial response to the February Canterbury earthquake.10
For example, they identified that backup systems for life-line services such as water, communication and electricity were significant challenges during the initial response. They emphasised the need for integrated planning of hospital and community based healthcare facilities to ensure that appropriate response to the influx of injured people is unified. The review also found that management of volunteering was a challenge during the initial response and future emergency plans in New Zealand should clarify such issues. The review by Ardagh and colleagues focuses on the initial response only.

The limited involvement of clinical staff in emergency preparedness is a significant challenge reported by emergency planners in this study. Clinical staff are the frontline providers that execute any emergency plans during a disaster response. Clinical providers have to be involved in emergency preparedness in order familiarizes themselves with the process of disaster response so execution of such plans during a disaster response becomes a drill. One way of involving clinical providers in emergency preparedness is for the Ministry of Health to provide extensive and comprehensive training opportunities to all healthcare services in New Zealand.

Furthermore, incentive programs for clinical personnel to actively participate in disaster preparedness activities would be helpful. Until clinical providers take ownership and get involved in disaster preparedness then there will always be a gap between emergency planning and disaster response execution.

Volunteering is another issue reported by emergency planners and appeared to be a challenge during the response to the February Canterbury Earthquake. When disasters strike, a large number of people arrive at the scene to offer assistance and help. This phenomenon is usually referred to as “convergence”. Reports from international disasters showed that between 10% and 70% of disaster responders are volunteers not accounted for during disaster planning process. For example, following the 9/11 attacks there were 40,000 volunteers who reported to Ground Zero within days of the disaster. There were multiple great examples of volunteering during the recent Canterbury earthquakes such as the Student Army and the Farmy Army. There were about 9000 students (including medical students) who contributed to the disaster response and recovery in Christchurch. Medical students participated in the initial hours of the response. They carried out essential tasks such as preparing intravenous fluid packs for crush syndrome victims and dressing simple wounds. Their role was greatly appreciated by clinical personnel who had more time to look after the very sick victims when simple tasks were done by medical students.

Volunteers can be a valuable asset that provides a timely work force and expertise. This can only be achieved if volunteers are utilised and channelled appropriately, especially during the initial hours of the emergency in which the main response relies heavily on local personnel to provide search and rescue.

Disaster preparedness experts have argued that the economic advantage of having volunteers in a disaster response alone could justify planning for volunteers to be part of the overall disaster preparedness plan.
There are several strengths and limitations of this paper. First, 5 of 21 DHBs declined to participate in this study. The 16 participating DHBs represented a wide range of geographic areas. Thematic saturation was reached when analyzing the data suggesting additional interviews would have yielded little or no new information.

This study is the first to address the issue of strategic DHB level healthcare emergency preparedness in New Zealand. The study is limited by its focus on strategic disaster preparedness and the challenges presented might not reflect operational matters such as the perception of clinicians about the role of emergency planners.

This paper does not examine how these challenges have played out during the response to the Canterbury Earthquakes because (at the time of writing this paper) the lessons from the Canterbury earthquake medical response were limited. For future research, it will be interesting to investigate how the challenges reported in this paper reflect the response during the Canterbury earthquakes.

In conclusion, disaster preparedness in New Zealand has faced several challenges that may have shaped the country’s response to the devastating Canterbury Earthquakes.

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References:


