

# Hospital Disaster Planning in the Western Cape, South Africa

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## Abstract

**Introduction:** The aim of this study was to describe the current state of disaster preparedness in hospitals in the public sector in the Western Cape, South Africa with the advent of the FIFA 2010 Soccer World Cup. The objectives included the completion of a self-reported assessment of readiness at all Western Cape public sector hospitals, to identify best practice and shortfalls in these facilities, as well as putting forward recommendations for improving disaster preparedness at these hospitals.

**Methods:** The National Department of Health, as part of the planning for the FIFA 2010 World Cup, appointed an expert committee to coordinate improvements in disaster medicine throughout the country. This workgroup developed a Self Reported Hospital Assessment Questionnaire, which was sent to all hospitals across the country. Data only were collected from public hospitals in the Western Cape and entered onto a purpose-built database. Basic descriptive statistics were calculated. Ethical approval was obtained from the Health Sciences Faculty Research Committee of the University of Cape Town.

**Results:** Twenty-seven of the 41 (68%) public hospitals provided completed data on disaster planning. The study was able to ascertain what infrastructure is available and what planning already has been implemented at these institutions.

**Recommendations:** Most hospitals in the Western Cape have a disaster plan for their facility. Certain areas need more focus and attention; these include: (1) increasing collaborative partnerships; (2) improving HAZMAT response resources; (3) specific plans for vulnerable populations; (4) contingency plans for communication failure; (5) visitor, media and VIP dedicated areas and personnel; (6) evacuation and surge capacity plans; and (7) increased attention to training and disaster plan exercises.

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## Introduction

On 15 May 2004, South Africa won the bid to host the 2010 Fédération Internationale de Football Association (FIFA) Soccer World Cup. This was the first time that the tournament has been staged on the African continent. South Africa has hosted large sport events before: the Rugby World Cup in 1995; the Cricket World Cup in 2003; the Women's World Cup of Golf in 2005 and 2006, and the inaugural A1 GP World Cup of Motorsport in 2006. However, none of these compare in scale to the Soccer World Cup, which is the world's biggest sporting event after the Olympics, in terms of television audience, it is larger than the Olympics. An estimated 3 million international visitors have travelled to host countries in the past to be part of this sporting epic,<sup>1</sup> and 2010 was not expected to be any different. This creates a huge logistical challenge for the host country. As part of the guarantees given by the National Government on being awarded the 2010 World Cup, the National Department of Health (NDoH) provided certain health guarantees.<sup>2</sup> They included:

1. The provision of a comprehensive medical service (including 24-hour emergency medical treatment) and disaster management at the disposal of the FIFA World Cup in the host cities;
2. The National Health Operations Centre (Nathoc) was linked to all nine South African provinces, ensuring real-time monitoring, collating and reporting on the roll-out of the health plan, and incident reporting;

3. Free primary health care (PHC) was provided for all spectators at official venues and dispensing machines for basic drugs available at all stadiums;
4. Fully equipped medical centres, medical PHC posts, and roving healthcare providers were operational in all stadiums and stadium precincts;
5. Active management of environmental health at was implemented at the stadiums;
6. Compliance with local and international health requirements was mandated for all visitors at all ports of entry to South Africa;
7. Local and international disease outbreak surveillance was implemented;
8. Special provisions for the licensing of foreign-qualified medical and allied health professionals; and
9. Contingency planning and liaison with South African Police Service, National Intelligence Agency, and fire and disaster management agencies.

A multi-sectoral and intra-governmental Health Technical Task team was established. There were 15 expert work groups, a national programme unit and nine provincial programme managers.

The World Cup served as a catalyst to improve existing health structures: emphasis was placed on emergency medicine and disaster medicine. These improvements included the spending of 37 million rand to provide state-of-the-art communication centres in the major cities. The existing medical helicopter services were extended to include all nine provinces, and 450 emergency vehicles were replaced over a three year period. Eight million rand had been ear-marked to upgrade emergency centres designated for the World Cup<sup>3</sup>. Similar arrangements were being made for health care on a provincial level in the Western Cape, driven by a locally appointed provincial coordinator.

The Western Cape is one of the nine provinces of South Africa.<sup>4</sup> Cape Town is situated right at the most south western corner of South Africa and is the tertiary drainage area for all patients in the province. The health system of the Western Cape is divided into clinics and hospitals at district, regional, and central level (Table 1).<sup>5</sup> There are 334 clinics that offer primary health care; district hospitals are capable of providing basic inpatient care; regional hospitals are larger than district hospitals and have some general specialist care on-site; the only three central (tertiary) hospitals in the Western Cape are situated in Cape Town (Groote Schuur, Tygerberg, and Red Cross Children's Hospital).

Like emergency medicine, disaster medicine in South Africa still is relatively in its infancy.<sup>6,7</sup>

The aim of this study was to describe the state of disaster preparedness in hospitals in the public sector in the Western Cape prior to the World Cup.

In order to achieve this aim, the study had the following objectives:

1. Undertake a self-reported assessment of the state of readiness of all Western Cape public-sector hospitals;
2. Identify shortfalls in the preparedness in these facilities, and make focussed recommendations to address these (on an individual facility basis);
3. Identify best practice in preparedness in these facilities, and disseminate such information to other hospitals; and

4. Make recommendations for improving the state of readiness for disasters in the Western Cape public sector hospitals.

### Methods

As part of the planning for the FIFA 2010 World Cup, the National Department of Health appointed an expert committee to coordinate improvements in disaster medicine throughout the country. One of the actions of that committee was to develop a Self Reported Assessment questionnaire for both hospitals and emergency medical services (EMS).

The questionnaire comprises four different assessment areas: (1) hospital overview; (2) emergency centre; (3) disaster planning; and (4) sexual assault survivor services. The questionnaires were sent by the workgroup to all hospitals across the country, both private and public. Completed questionnaires were entered onto a purpose-built database (Verticalapps, 2008).

For the purposes of this study, all data relating to disaster planning in public hospitals in the Western Cape were analysed.

### Inclusion and Exclusion

All public sector hospitals in the Western Cape were eligible for inclusion. Hospitals were excluded if the questionnaire was not returned, or if they were not within the public sector.

### Database

All data pertaining to hospital disaster planning were abstracted from the FIFA database to Microsoft Excel (©Microsoft, Redmond, WA, 2007).

All data were cross-checked against the submitted questionnaires, and amended if found to have been entered incorrectly. For unclear, missing or discrepant data, the person who had completed the form was contacted and the submitted data were verified.

### Data Processing

Basic descriptive were calculated using Microsoft Excel 2007 for Windows.

### Ethical Considerations

The database was held on a password-protected work computer. Ethical approval for the study was obtained from the Health Sciences Faculty Research Ethics Committee of the University of Cape Town.

### Results

#### Returns

Of the 41 public sector hospitals sent the questionnaire, 27 (68%) provided complete data on disaster planning. Fourteen hospitals (35%) provided incomplete data or did not return the forms, and so were excluded from the study. Of the 27 respondents, three (10%) were central (tertiary) hospitals, eight (28%) were regional and the remainder district level facilities.

#### Hospital Disaster Planning

A total 92.5% of responding hospitals had disaster plans in place. This included all of the central hospitals but the smaller district hospitals had the lowest percentage (56%). Just more than half the Western Cape public hospitals (56%) had a dedicated, multidisciplinary, disaster planning committee that includes administrative members and controlling staff, and a similar

	Metro West	Metro East	George	Worcester	Paarl
Central	Groote Schuur, Red Cross	Tygerberg			
Metro Regional	Somerset Victoria	GF Jooste Helderberg Karl Bremer			
Rural Regional			George	Worcester	Paarl
District	False Bay Wesfleur	Eerste River	Beaufort West Murraysburg Ladismith Knysna Mossel Bay Riversdale Outshoorn Uniondale Nelspoort Prins Albert	Montague Robertson Ceres Hermanus Caledon Swellendam Bredasdorp	Stellenbosch Citrusdal Clanwilliam Lapa Munnik Swartland Radie Kotze Laingsburg Vredendal Vredenburg

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**Table 1**—Government hospitals in the Western Cape according to geographical service areas

number (50%) had a collaborative relationship with other health services (including local EMS, local disaster management, provincial health department, the local health department, and the regional military health services). The biggest collaborative partnership was with the local emergency medical services, which makes sense, as this service interfaces closely with hospitals on a day-to-day basis. Only 67% of central hospitals, 20% of metro regional, 19% of district hospitals, and no rural regional hospitals had a relationship with military health services. This could have been due to the fact that there is only one large military hospital located in Cape Town, but also because facilities may have not known what resources the military has or how to access military health care.

Detailed plans for internal and external disasters were available in 78% of hospitals; 14.8% had not widely distributed the plan, or did not have it readily available throughout the facility. This would suggest that disaster plans were easily accessible in most of the facilities, but anecdotal findings on further discussion with healthcare providers in the different hospitals suggested that the plans often were difficult to locate and the end users often were not even aware of its existence. These findings also have been confirmed in other studies.<sup>8-10</sup> The latest version of the disaster plan only was available to the user at 33% of facilities.

What constitutes a “major incident” for that specific hospital was specified clearly in 67% of hospitals which would imply that those facilities are aware of their specific capacity and available resources and understand when those are inadequate for the responses needed. However, only one-third had included an assessment of local hazards and risks in their planning. The lowest percentage (20%) was from the metro regional hospitals, which were situated in developed urban areas with all of the associated disaster risk factors of industry, transport infrastructure, and high population densities. Two-thirds had included contingency plans for when routine emergency resources and facilities are inadequate, with 100% of rural regional hospitals having such plans. Only 15% of hospitals included specific procedures

for dealing with a chemical/biological or radiation incident in their planning. These included two of the three central hospitals, and two of the metro regional hospitals. This may have been because the only nuclear power station in South Africa, Koeberg, is situated approximately 20 kilometers outside the city center. Some facilities may have felt that victims of a radiation/nuclear disaster would be transferred preferentially to one of the central city hospitals so that they can receive specialist medical care. However, there are numerous pockets of heavy industry all over the city and in some rural areas that could potentially affect surrounding hospitals.

*Surveillance*

In terms of perceived surge capacity, the total number of patients that could have been managed at any one time in the provincial emergency centers was 1,004. Only 26% of facilities had any realistic idea of their current surge capacity. The increasing burden of overcrowding in emergency centers nationally, not only on the Western Cape, should have resulted in discussions and planning for daily surge capacity. Many of these recommendations were extrapolated to the disaster situation. Lack of buy-in from all role players linked to the creation of surge capacity remains a concern.

*Identification of Authorized Personnel*

The majority of hospitals (78%) had a designated medical commander and had identified key personnel in their disaster plan; the same percentage had a notification system in place to alert staff. This confirms the importance of a structured chain of command for any successful response to occur. Only 59% of hospitals felt that the relevant personnel were familiar with the plan, with only 40% in the metro regional hospitals. This would serve to undermine the chain of command because it is vital that all role players in the disaster plan are aware of what their specific tasks are. Only 63% of hospitals have action cards. District hospitals were least likely to have action cards available for their staff (44%).

*Activation of the Plan*

More than 60% of hospitals specified the criteria necessary to activate their hospital disaster plan and had guidelines and procedures to escalate or step down the disaster response.

*Alerting System*

A total of 81% of hospitals specified how notification in the hospital would occur, and had a detailed system for recalling staff back on duty. All central hospitals achieved this versus only 67% of rural regional hospitals.

*Response*

Internal disaster plans were available for 74% of hospitals. This included only 67% of central hospitals, which cover large urban areas, have more hospital beds, and patients than other facilities, and possibly the greater chance for victims to become casualties. Two-thirds had a recognized system of responding to and sending resources to an external disaster; these included all central hospitals (possibly because of the greater concentration of personnel and equipment resources compared to the other facilities) and all rural regional hospitals (these facilities often are seen as centers for clinical outreach for the surrounding geographical area).

Less than 20% of hospitals included in the survey had dedicated facilities to receive and treat contaminated patients. Only two hospitals had a separate entrance to the Emergency Centre for decontaminated patients, and had a dedicated water system to accomplish decontamination.

Sixty-one percent established communication links between themselves and other local agencies that would be involved in a disaster response. Almost one-third of hospitals would have been able to make provisions for extra mortuary facilities and for the preservation of forensic evidence. Vulnerable populations which include children, the elderly and disabled also are not considered in hospital disaster plans often, and this is evident because only 22% of hospitals have special arrangements for unaccompanied minors (this includes the only paediatric central hospital). These results are compatible with a Delphi study done by Carley and Mackway-Jones.<sup>13,14</sup>

*Hospital Disaster Operations Centre*

All of the central hospitals had designated a site to the operations centre and clear procedures were in place to establish control. The district hospitals were less likely to have a designated hospital disaster operations center, and were less likely to have an alternative communication strategy as a back up.

*Security*

Security is well addressed in most facilities. Although plans for controlling the area are in place, less than half the facilities had actually tested their plans to be certain that all problems had been addressed.

*Communication Systems*

Approximately half of the disaster plans had contingency plans, should the existing communication system fail.

*Internal and External Traffic Flow and Control*

The control of internal traffic flow in was detailed in 59% of hospitals. This was addressed by most of the metro regional hospitals, but not the other facilities. The majority (63%) also

had specified areas for ambulances, supply vehicles, and authorized personnel.

*Visitors*

Any major incident or disaster in a local area will result in an influx concerned relatives and visitors to the receiving facility. Less than half of hospitals (40.7%) had provision in their plans for the influx of family members and visitors, or had established designated areas for waiting rooms.

*Media*

Only 40% of hospitals had allocated a specific area in the hospital to house the media and had identified areas suitable to hold press briefings. A total of 70% have a designated internal spokesperson to liaise with the media.

*Reception of Casualties and Victims*

The reception phase of the major incident response was covered by the majority of facilities. The majority (74–85%) of hospitals had a system of flow within the emergency centre for triaging and identification of patients, as well as plans for the movement of patients out of the unit. More than three-quarters had plans in place to address the hospital's surge capacity. The majority of hospitals have an efficient plan to obtain documentation for the disaster victims and have designated areas to attend to the victims and have quick access to extra stock and supplies that may be needed.

*Hospital Evacuation*

Sixty percent of hospitals do not have a clear plan in place to facilitate the quick discharge of patients or to transfer existing patients to other local health facilities.

*Hospital Out of Communication or Cut Off from Resources*

A total of 40% have an assigned position for food and water rationing and waste and garbage disposal. Sixty percent considered the rest and rotation of staff in their plan.

*Equipment, Services, Facility and Lab Assessments*

There was a wide range of equipment available for disaster management (Table 2).

*Post-Disaster Recovery*

Forty-eight percent of hospital plans had clear methods to deal with the recovery phases.

*Education and Training*

The majority of hospitals did not have a dedicated disaster plan training program, or educate their new staff as to the institution's disaster plan. None of the central hospitals, and only a few of the district hospitals had training programs.

*Exercising the Disaster Plan*

There was a very low percentage of hospitals in all categories that actually exercised their plan and trained their staff at the same time. Only 7% of hospitals exercised their disaster plan bi-annually; 28% ensured that all key players were familiar with the plan. Only two hospitals complied with both.

Equipment	Median, Range
Adult ventilators	2 (0–104)
Paediatric ventilators	1 (0–22)
Suction machines	16 (0–180)
Stretchers	10 (2–406)
Intravenous pumps	6 (0–700)
Beds	90 (15–940)
Wheelchairs	6 (2–108)

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**Table 2**—Median and ranges of equipment in hospitals in the Western Cape

#### *Incident Command System*

A total of 48.5% of the disaster plans identified personnel to fill each of the roles in the Incident Command System.

#### **Discussion**

##### *Identification of Authorized Personnel*

Action cards are important *aides memoires* for the disaster plan. They compensate for the fact that disasters do not happen very often, and there often is a lack of expertise and lack of training in a facility and they help to ensure a coordinated response.

##### *Activation of the Plan*

Lack of plan activation can result in increased morbidity and mortality related to the disaster whereas inappropriate activation can utilise and deplete scarce resources.<sup>11</sup> That is why having clear activation criteria is necessary.

##### *Alerting System*

The declaration of a major incident and subsequent dissemination of this information is an important step in the disaster response process. It helps to ensure that all vital role players are able to begin appropriate staff mobilisation and that the correct resources are accessed.

##### *Response*

Clark S et al<sup>12</sup> highlighted that although there is a national system in place in the United Kingdom to decontaminate chemically contaminated casualties, these resources could be easily overwhelmed if there were large numbers of casualties involved.

Less than 20% of hospitals included in the survey had dedicated facilities to receive and treat contaminated patients. Only two hospitals had a separate entrance to the Emergency Centre for decontaminated patients, and had a dedicated water system to accomplish decontamination. These figures are of grave concern because the possibility of an emergency centre becoming contaminated from victims and then the disaster escalates. Many emergency centres were built decades ago and provision wasn't made for HAZMAT emergencies. Numerous facilities have completed or are undergoing construction work and decontamination areas are being added.

##### *Security*

Too many hospitals concentrate on controlling access to the facility itself and not enough focus on the control of the whole area to vehicular and pedestrian access and egress. Security falls within the command and control structure of a major incident and it a vital component to ensure access to the hospital and to protect the patients and staff at that specific facility.

##### *Communication Systems*

All too often, excessive reliance is placed on traditional methods of communication in a disaster such as telephones and cellular phones. These methods of communications can become overwhelmed with traffic or even cease to work depending on the nature of the incident. Alternative systems need to be in place so that they can be utilised if necessary. These include the use of personnel radios, runners, facility intercom system etc.

##### *Internal and External Traffic Flow and Control*

Standard day-to-day practice in a hospital should utilise the best flow through clinical and non clinical areas to optimise the use of space and to streamline internal traffic. These basic principles need to be in place so that in the event of a disaster, the concepts are already being practiced and are known and logical to all staff and patients. The majority of hospitals have considered the impact of external traffic on the flow into the hospital grounds as well as possible exit points.

##### *Visitors*

This could result in a very real overcrowding of the facility which can have a negative on the internal and external flow. Approximately a third of all the larger hospitals have clear instructions for dealing with the arrival of VIPs and very few of the smaller district hospitals. This may be because the smaller facilities are less likely to receive such a visit and haven't had much experience in dealing with them in the past.

##### *Media*

The media are an integral component of a disaster response who need to be briefed and managed while the response is occurring.

##### *Reception of Casualties and Victims*

Once again an area of concern is the lack of planning by facilities for contaminated victims as only 29% have an approach to segregate contaminated disaster victims from the rest of the hospital.

##### *Hospital Evacuation*

The rapid and safe discharge of patients is an important component of increasing surge capacity. Facilities also need to make use of other local and community areas as possible areas to forward transfer patients.<sup>15,16</sup>

##### *Hospital Out of Communication or Cut Off from Resources*

The event of a major incident occurring in which basic infrastructure is affected including electricity and water supply has become a more frequent occurrence if one examines recent natural disasters all over the world. Facilities need to have plans in place to address these issues. In the event of a breakdown in channels of communication or services to the hospitals concerned, 70% have a designated person responsible for auxiliary power. Teams must be given adequate time to rest between shifts as the workload will be high during the initial first few days.

### Post-Disaster Recovery

There is not enough emphasis placed on this component of the disaster plan. A facility needs to be clear about the clinical and managerial procedures that need to be followed at the end of the response to ensure that the hospital returns to its full functional state and capacity after the event.

### Education and Training

The majority of hospitals did not have a dedicated disaster plan training program. This is especially worrying in a large central hospital, as there are many more staff working in different departments that need to be informed about the plan. Specialist clinical services are concentrated in central hospitals, and patients from a disaster often are transferred from peripheral facilities. It is important that ongoing training occurs in these large institutions to ensure an appropriate response.

### Exercising the Disaster Plan

Disaster exercises also allow staff members to become more familiar with the plan. Exercising the hospital disaster plan is a method of monitoring and evaluating different components of the plan. Mock exercises with or without casualties are useful tools to refine the disaster plan further and to identify potential problem areas. The aspect of the plan to be appraised must be clear and specified and can be achieved by using operational or tabletop exercises. A vital aspect to training and awareness is hospital plan drills, but they take time to perform, and government funding and buy-in to the concept is essential for success. Bartley *et al* made a pertinent observation, "it is very difficult to determine how much time, money and effort should be spent on preparing for an event that may not occur."<sup>17</sup>

### Incident Command System

The allocation of command roles helps to bring coordination and control to a response.

### Limitations

This study was limited by use of self-reported assessments. This could have resulted in respondent error or deliberate mis-information. Only missing data were traced by contact with the relevant person at the respective hospital: no other checks of data integrity were performed. However, it is likely that any

mis-information would have been in the favor of the hospital (i.e., overstating their degree of preparedness), and therefore, the results of this study should be seen as a best case scenario. Visiting each hospital individually with the same data collector could have minimized any errors from this method. However, this project formed part of a national survey and assessment, and it was important, therefore, that identical methodology be followed throughout the country.

### Conclusions

Major incidents are not predictable and occur with very little, if any, warning.<sup>18</sup> Preparation and mitigation are two key components to ensure a coordinated response. Certain areas have been raised in this study that had to be addressed and improved by health facilities in the Western Cape prior to the 2010 World Cup. These included:

1. All health facilities needed to have a disaster plan that is familiar to all staff, that is easily accessible, and regular staff training in the disaster response for the facility must occur;
2. Collaborative local and national partnerships are important and needed to be developed;
3. The response to and resources for HAZMAT incidents needed to be addressed at almost every facility;
4. The provision for vulnerable populations had to be included in disaster planning;
5. The Hospital Disaster Operations Centre had to be defined and the roles of the incident command system had to be assigned;
6. Contingency plans for communication failures need to be in place.
7. Visitors, media and VIPs had to be managed within dedicated areas with specific staff members;
8. Hospitals needed to have a robust evacuation plan, and a specified plan to create extra surge capacity;
9. More emphasis had to be placed on recovery, and include role players from hospital management, clinical services and support services; and
10. Disaster plan training and exercises could not be overemphasised. A formal program had to exist in a facility to engage all staff members on a regular basis.

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