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**Level of Hospitals' Preparedness for a Mass Disaster  
during the 2010 FIFA World Cup Soccer in the  
eThekweni District of KwaZulu-Natal**

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This dissertation is submitted in partial fulfillment of the academic requirements  
for the degree MMed Public Health Medicine

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## Acronyms and Abbreviations

ACLS	Advanced Cardiac Life Support
APLS	Advanced Paediatric Life Support
ATLS	Advanced Trauma Life support
ARVs	Anti-retroviral medications
BLS	Basic Life Support
BREC	Biomedical Research Ethics Committee
CPR	Cardiopulmonary resuscitation
COHSASA	The Council for Health Services Accreditation of Southern Africa
CT	Computed Tomography
Dip PEC (SA)	Diploma in Primary Emergency Care
EMRS	Emergency Medical Rescue Services
FIFA	Fédération Internationale de Football Association
HIV	Human Immunodeficiency Virus
HMIMMS	Hospital Major Incident Medical Management and Support
ICU	Intensive Care Unit
CCU	Cardiac Care Unit
IALCH	Inkosi Albert Luthuli Central Hospital
ISS	International Society of Surgery
MIMMS	Major Incident Management System
NHLS	The National Health Laboratory Services
NHS	National Health System
PALS	Paediatric Advanced Life Support
PHOC	Provincial Hospital Operations Centre

PLS	Paediatric Life Support
TB	Tuberculosis
UKZN	University of KwaZulu-Natal
WHO	World Health Organisation

## Abstract

International mass sports gatherings like the FIFA (Fédération Internationale de Football Association) World Cup Soccer and Olympics can cause great challenges to local healthcare systems and emergency medical services. History has shown that disasters do occur during these events, whether on a small or large scale. Disaster Management Practitioners from the public health perspective widely recognize that poor planning and a range of other underlying factors, create conditions of vulnerability. These result in insufficient capacity or measures to reduce hazards' potentially negative consequences.

The eThekweni District has to be prepared in the event of a mass disaster. Pre-empting and planning for disasters will lead to the safety and security of our citizens. The aim of this study was to undertake a baseline survey (in a total number of eleven public sector hospitals) to assess the state of hospital readiness, medical preparedness, and emergency care in preparation for the 2010 FIFA World Cup Soccer in the eThekweni District. A general assessment tool in the form of a standard questionnaire, and a walkthrough visit with a checklist, was used to collect data.

There is no previous study conducted at the eThekweni District to assess requirements for an international event in terms of a mass disaster. South Africa is a developing country, and this was the first time any developing country had hosted a sporting event on such a large magnitude thus there are no international standards on sports disaster management by any other developing countries to generalise to eThekweni District. The current disaster management operational plan that is being used for the World Cup is based on a United Kingdom integrated management philosophy tool.

The study herein adopted a public health approach and incorporates the Yokohama Strategy within its tool along with the use of HMIMMS and MIMMS in the assessment of the clinical criteria. The perceived minimum requirements suggested by the hospitals and a Provincial Task Team, from the Provincial Health Disaster Management office, was used as a guideline.

The study showed that although disaster plans and policies are in situ, there still exists a need for resources to be directed toward skills training, attraction and retention of healthcare professionals, revitalisation of emergency and theatre areas and the commissioning of more isolation units. The results of the study would enable the District Office to note any shortcomings and lack of resources in public sector hospitals. The study outcome would be important for the implementation of any strategic planning to aid the hospitals in preparation for mass disasters that may occur during the 2010 FIFA World Cup Soccer.

## Contents

Declaration.....	i
Acknowledgements.....	ii
Acronyms and Abbreviations .....	iii
Abstract.....	v
Contents .....	vi
List of Tables .....	ix
List of Figures.....	x
Chapter 1: Introduction.....	1
Chapter 2: Literature Review .....	4
2.1 The History of Sports Disasters .....	4
2.2 Disaster Management Policy .....	5
2.3 Disaster and Mass Casualty Planning in a Hospital.....	8
2.4 Hospital Disaster Plan.....	9
2.5 2010 FIFA World Cup Soccer .....	12
Chapter 3: Research Methodology.....	16
3.1 Study Aim.....	16
3.2 Study Objectives .....	16
3.3 Type of Research .....	16
3.4 Study Setting.....	16
3.5 Study Design.....	16
3.6 Study Population Inclusion.....	16
3.7 Study Population Exclusion.....	16
3.8 Sampling Method / Size.....	17
3.9 Data Collection .....	17
3.10 Statistical Analysis.....	18
3.11 Pilot Study.....	18
3.12 Reduction of Bias.....	18
3.13 Reliability.....	18
3.14 Validity .....	18
3.15 Ethics and Permission .....	19
Chapter 4: Results.....	20
4.1 Results for each Hospital .....	20
4.2 Section A – Disaster Plans, Policies and communication.....	27
4.3 Section B – Medical Services and Emergency Facilities.....	29

4.4 Section C – Emergency, Theatre and Isolation Areas.....	31
4.5 Section D – Drugs and Equipment.....	33
4.6 Section E – Human Resources .....	33
Chapter 5: Discussion .....	38
5.1 Section A- Disaster Plans, Policies and Communication.....	38
5.1.1 Disaster Plans, Management and Administration .....	38
5.1.2 Communication networking.....	39
5.1.3 A Central Bed Bureau .....	41
5.2 Section B-Medical Services and Emergency Facilities .....	42
5.3 Section C-Emergency, Theatre and Isolation Areas .....	44
5.4 Section D- Drugs and Equipment .....	45
5.5 Section E- Human Resources.....	46
5.5.1 Staff Employment, Recruitment and Skills Training.....	46
5.5.2 Waste Disposal, Water and Sanitation .....	48
5.5.3 Electricity and Maintenance.....	49
5.5.4 Occupational Health and Safety.....	49
5.5.5 Community Participation and Volunteers.....	50
5.6 Limitations of the Study.....	51
5.6.1 Excluded Hospitals .....	51
5.6.2 Emergency Services.....	51
5.6.3 Support Services .....	51
5.6.4 Laboratory Services .....	52
5.6.5 Mortuary Services .....	53
5.6.6 Housekeeping, Laundry, Catering Services .....	53
5.6.7 Security .....	54
5.6.8 Economic Costing .....	54
5.6.9 Qualitative Perceptions .....	55
Chapter 6: Recommendations .....	56
6.1 Section A- Disaster Plans, Policies and Communication.....	56
6.1.1 Establish a Central Disaster Management Centre.....	56
6.1.2 Establish a Central Bed Bureau.....	56

6.1.3 Governance: Organizational, Legal and Policy Frameworks.....	56
6.2 Section B - Medical Services and Emergency Facilities .....	57
6.3 Section C- Emergency Theatre and Isolation Areas .....	58
6.4 Section D- Drugs and Equipment .....	59
6.5 Section E-Human Resources.....	60
6.5.1 Health Promotion, Information Exchange and Public Awareness.....	60
6.5.2 Staff Recruitment, Retention and Skills Training.....	60
6.5.3 Research.....	61
7. Conclusion .....	62
Chapter 8: References.....	64
Chapter 9: Addenda .....	66
Appendix A-Letter of Approval Department of Health.....	66
Appendix B - Research Questionnaire.....	67
Appendix C - Information to the Participants / Hospital CEO's.....	73
Appendix D- Informed Consent / Consent to Participate in Research.....	74
Appendix E – Participating Hospitals.....	75
Appendix F-Letter of Ethics Approval .....	76
Appendix G - Letter of Postgraduate Approval.....	78

## List of Tables

Table 1: Average percentage according to Sections in Hospital A (Tertiary Hospital) in the eThekwini District in 2009 .....	20
Table 2: Average percentage according to Sections in Hospital B (Regional Hospital) in the eThekwini District in 2009 .....	20
Table 3: Average percentage according to Sections in Hospital C (Regional Hospital) in the eThekwini District in 2009 .....	21
Table 4: Average percentage according to Sections in Hospital D (Regional Hospital) in the eThekwini District in 2009 .....	21
Table 5: Average percentage according to Sections in Hospital E (Regional Hospital) in the eThekwini District in 2009 .....	22
Table 6: Average percentage according to Sections in Hospital F (Large District) in the eThekwini District in 2009 .....	22
Table 7: Average percentage according to Sections in Hospital G (Large District) in eThekwini District in 2009 .....	23
Table 8: Average percentage according to Sections in Hospital H (Small District) in the eThekwini District in 2009 .....	23
Table 9: Average percentage according to Sections in Hospital I (Small District) in eThekwini District in 2009 .....	24
Table 10: Average percentage according to Sections in Hospital J (Large District) in eThekwini District in 2009 .....	24
Table 11: Average percentage according to Sections in Hospital K (Small District) in eThekwini District in 2009 .....	25
Table 12: Average percentage of each of the 11 hospitals in the eThekwini District in terms of the variables assessed in 2009 .....	25
Table 13: Average percentage of an overview of the mean and the standard deviation of the variables scored by averaging the 11 hospitals in the eThekwini District in 2009 .....	26
Table 14: The average percentage of the different emergency services delivered by the 11 hospitals in the eThekwini District in 2009 .....	30
Table 15 : The types of skills training undertaken by the total number of doctors and nurses with valid certificates in the 11 hospitals in the eThekwini District in 2009.....	35

## List of Figures

Figure 1 : The overview of the total percentage response to all variables assessed in the 11 hospitals in the eThekwini District in terms of standard deviation, the upper and lower mean in 2009.....	26
Figure 2: The percentage availability of disaster plans, policies and communication in the hospitals in eThekwini District in 2009 .....	27
Figure 3: The percentage availability of medical services and emergency facilities in the hospitals in eThekwini District in 2009 .....	29
Figure 4: The percentage availability of emergency, theatre and isolation areas in the hospitals in eThekwini District in 2009 .....	31
Figure 5: The percentage availability of drugs and equipment in the hospitals in eThekwini District in 2009 .....	33
Figure 6 : The total number of doctors in each of the 11 hospitals in the eThekwini District with skills training ATLS, ACLS, APLS, MIMMS and HMIMMS respectively in 2009.....	34

## **Chapter 1: Introduction**

International mass sports gatherings like the FIFA (Fédération Internationale de Football Association) World Cup Soccer and Olympics can cause great challenges to local healthcare systems and emergency medical services. Traditionally, planning has been based on retrospective reports of previous events, but there still is a need for prospective studies in order to make the process more evidence-based.

Mass-gatherings events provide difficult settings for which to plan appropriate emergency medical responses. Many of the variables that affect the level and types of medical needs have not been fully researched. Multiple variables are present during a mass gathering, and they interact in complex and dynamic ways. The interaction of these variables contributes to the number of patients treated at an event (medical usage rate) as well as the observed injury patterns. Important variables include weather, event type, event duration, age, crowd mood and density, attendance, and alcohol and drug use. This includes prevailing political moods internationally and locally such as terrorist activities incited to harm people to send a message through to the government of that particular country.

The International Red Cross and Red Crescent Movement is based on the principles to alleviate human suffering. The ethics of this humanitarian action reasserts the basic humanitarian principles of humanity, impartiality and independence incorporating concepts such as respect for culture, participation, sustainability and accountability. A Code of Conduct was developed by the International Federation, the International Committee of the Red Cross (ICRC) in order to set standards for the conduct of disaster relief operations. [1]

The ICRC states that disaster preparedness provides a platform for the design of effective, realistic and coordinated planning. Risk reduction and disaster preparedness can prevent disaster situations and in the event of a disaster, it can promote a faster recovery period. The aim of a disaster is to respond rapidly and effectively as possible. This involves mobilizing resources (staff, equipment, monetary) in an effective and coordinated manner. Thus the primary objective of a disaster would be to minimise immediate danger and to stabilise the physical and emotional condition of survivors. [1]

Thus the study has been commissioned by the District Office in preparation for the 2010 FIFA World Cup Soccer. The report presents the findings of a baseline survey of public sector hospitals within the eThekweni District to assess their readiness for emergency in-hospital management of a disaster. (Appendix A)

Apart from the study being commissioned by the eThekweni District Office, the rationale behind this study has important public health significance. As a developing country hosting the 2010 FIFA World Cup Soccer, it is important we identify our gaps and deficiencies in order to strengthen the healthcare

system. Although there is a Disaster Management Act of 2002, what was actually undertaken by the hospitals in terms of planning, preparation and resources at a district level, was the basis of the study. Apart from one or two hospitals being COHSASA accredited, the actual state of readiness of the hospitals could not be assessed just via accreditation, which in this scenario wasn't undertaken at all hospitals and did not provide data for that of an international event. This is imperative in the planning and preparation for a disaster, especially of an international event. Considering the increased number of tourists and the diseases that can be brought into the country, we have to assess our own resources and state of readiness to be able to cope with any disaster and that of a greater magnitude.

We need to ultimately address the dynamic pressures and unsafe conditions especially as a developing country with already constrained resources. In doing so, we can prevent a disaster from occurring and mitigate against the hazards as contained in the White Paper on Disaster Management and section 6 of the Bill on Disaster Management. [2]

In terms of the Act, a disaster is defined as:

*'A progressive or sudden, widespread or localized, natural or human – caused occurrence which:*

- *Causes or threatens to cause death, injury or disease; damage to property, infrastructure or the environment; disruption of a community*
- *Is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources'* [2]

Disaster Management thus means a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures. These measures are aimed at preventing or reducing the risk of disasters, mitigating the severity or consequences of disasters and emergency preparedness. It also includes a rapid and effective response to disasters and post-disaster recovery and rehabilitation. [2]

In short, Disaster Management refers to programmes and measures designed to prevent, mitigate, prepare for, respond to and recover from the effects of all disasters.

In order to undertake this study to prepare for a disaster of a mass gathering, careful consideration had to be given to a developing country and its own needs and demands. Many disaster management tools exist, such as MIMMS (Major Incident Medical Management and Support) and HMIMMS (Hospital Major Incident Management System) used by the FIFA Association. Most of these tools have been researched and implemented in developed countries and that too with a large clinical focus.

For the purposes of this study, the researcher had modified the questionnaire created by the Provincial Task Team and introduced the Yokohama Strategy from the International Hyogo Framework on Disaster Management. The FIFA Association had instructed that a primary analysis be undertaken based on the MIMMS standards. However, in my opinion, its shortfall was that it lacked important

public health issues that are pertinent to a developing country such as South Africa. The Yokohama approach has been adopted from a public health perspective, and its rationale will be unpacked in the next chapter.

The researcher has included all hospitals within the eThekweni District. The rationale in adopting this approach is that from a public health perspective, it is important to include a comprehensive analysis of all available resources. In our already severely constrained resource setting country, it is imperative that we have a holistic view of the current available resources to further utilise if necessary. An example of this can be provided by the fact that the public sector hospitals face a challenge of bed shortages. In the face of a mass disaster, other hospitals can be used as step-down care facilities, or alternatively depending on their current resource availability, can actually be stepped-up or upgraded to the desired level of service.

The information obtained from the survey, will allow the district manager and hospital managers, to identify strengths and weaknesses in current healthcare provision within the eThekweni District. This will allow creation of a gap analysis, and formulation of an action plan to improve healthcare provision within eThekweni in preparation for the 2010 FIFA World Cup Soccer, in the event of a mass disaster.

## Chapter 2: Literature Review

### 2.1 The History of Sports Disasters

In 1989 football fans were crushed at a soccer match in Hillsborough, Britain, United Kingdom and approximately 93 football supporters were killed in Britain's worst-ever sporting disaster. They were crushed to death at Hillsborough stadium in Sheffield during a semi-final match between Nottingham Forest and Liverpool. The crush is said to have resulted from too many Liverpool fans being allowed in to the back of an already full stand. [3]

Nationally, the collapse of a stadium in Orkney, a town in the North-West Province, occurred in 1991. During this Orkney Stadium Disaster, 42 people lost their lives in a stampede after too many fans were admitted to the stadium. [4]

The Ellis Park Stadium Soccer Disaster, 2001, during which 43 people died when the stadium collapsed from being overfilled, brought the need for an appropriate strategy to deal with disasters at sports events sharply into focus.[5] The stadium already had a 68 000 capacity crowd, but a further 40 000 fans were admitted into the stadium. This was said to be the worst soccer disaster since the Orkney disaster.

Foreseeing disaster before it happens makes disaster management an exacting discipline. But it is in planning for such situations, that is the most critical. Poor emergency planning combined with a natural or man-made disaster, can quickly turn a terrible event into a tragedy.

Thousands could lose their lives; even more people may be incapacitated through injury. It is then that swift action is needed.

In response to Ellis Park disaster, the Disaster Management Bill was re-investigated to include sports disasters, and shifted the focus from reaction to minimizing human and economic losses by establishing prevention and mitigation as the core principle of disaster management policy. [2]

The Disaster Management Component of the Cape Region had implemented plans during the 2004 Cricket World Cup in the Western Cape Province. The disaster management was co-ordinated by the Department of Local Government with the co-ordination of fire-brigade services. The development of standards and norms was a priority. The disaster management plans, which had adhered to international best practices and norms, had formed part of the day to day management of the Cricket World Cup, in close co-operation with security forces.[6]

At a Disaster Management Indaba held in Gallagher Estate in Gauteng on 09 July 2008, the disaster risk management role players were looking at strategies to prevent, mitigate and minimize the impact of disasters. The intention was to create a culture of risk avoidance behaviour through public

awareness programmes and general life skills training within and beyond the education sector. Included on the agenda was the ability to fast track recovery. It was believed that the length of time taken to recover from disastrous events was perceived to be too lengthy and this was undermining public confidence in the governments' ability to recover from disastrous events. Another priority discussed was the creation of more resilient infrastructures in terms of roads, bridges, institutions such as hospitals, or the upgrading thereof. Another important objective stated was to reflect on the readiness of South African structures (hospitals in terms of healthcare). The Indaba inevitably highlighted the need for revitalisation of infrastructure especially hospitals. This would allow for increased access and an increase in important facilities such as the number of Intensive Care Units in the district, which is in keeping with the objectives of the study.

Further discussed was the deployment of the task team from the National Disaster Management Centre to assess disasters. The Centre had assisted the KwaZulu-Natal Province in July 2008, when a state of disaster was declared following a severe weather event, which had caused R 3.6 billion worth of damage. Road infrastructure funds, rehabilitation, temporary housing provision and ongoing food supplies were needed. The relevant fund for this post-disaster recovery was initiated by the Centre.[7]

## **2.2 Disaster Management Policy**

According to the National Department of Health, the ministerial guarantees to FIFA include health and medical services. The infrastructure of the South African National Health System will be available for use at the 2010 FIFA World Cup Soccer. It includes a disaster management and 24-hour emergency medical treatment. [8]

In terms of legislation, the cabinet remains committed to the overarching National Health Act. It would then make provision for health and medical services for mass gatherings, emergency centers and emergency medical services. Important Acts that govern the event include the Fire Service Act [8], and the Safety and Security Act. [8]

The role of the Department of Health is to ensure overall coordination and provision of health services. The Minister is the custodian of the health system in terms of both the public and private health care sector. [8]

Disaster Management Act, No. 57 of 2002 is a very important piece of legislation to ensure the safety and wellness of both the spectators and citizens of our country. The Disaster Management Act requires the establishment of a National Disaster Management Centre (NDMC) responsible for promoting an integrated and coordinated national disaster management policy. The Act gives explicit priority to the application of the principles of cooperative governance for the purposes of disaster management and emphasizes the involvement of all stakeholders in strengthening the capabilities of National, Provincial and Municipal government structures to reduce the likelihood and severity of

disasters. The Act also calls for the establishment of arrangements for cooperation with international role players and countries in the region.[2]

Today an operational National Disaster Management Centre with functional Disaster Management Centres as well as Advisory Forums exist in Pretoria. Various intergovernmental disaster management structures have been created and operationalised. These include the Intergovernmental Committee on Disaster Management which was established by the President of South Africa in June 2005. The National Disaster Management Advisory Forum was established in January 2007, and has been recognized by the United Nations as the National Platform for Disaster Risk Reduction.

In keeping with the Disaster Management Act, a R50 million disasters and emergency medical services centre was opened in Midrand, November 2007, as part of the Province's logistical preparations for the 2010 FIFA World Cup Soccer. The centre, a state-of-the-art Gauteng Disaster Management and the Emergency Management Medical Services (EMMS) centre aids the Gauteng Province to deal with emergencies and disasters at a central point.[9] This concept should ideally be decentralised to all provinces, including KwaZulu-Natal where a central disaster unit should be created. The Province would be able to analyse its entire resources which could then assist eThekweni District in additional or back-up supplies of resources should the need arise.

Many strategies exist to manage disasters. The current framework being used by the National Disaster Management Unit is the MIMMS and HIMMS tool developed in the United Kingdom. The concept of MIMMS and HMIMMS is an integrated management philosophy that is quite a useful tool. Many doctors and managers in the healthcare sector have been on training provided by facilitators for both HIMMS and HMIMMS.[10]

At a hospital level, the focus is mainly MIMMS, where a major incident is defined as any incident where the location, number, severity, or types live patients require extraordinary resources.

The essence of the system is a “universal language” for major incidents and includes 3 important components namely ‘METHANE’ activation, a ‘CSCATTT’ management algorithm and a specific two-tiered triage system.[10]

METHANE: When any of the existing emergency services received details of a potential major incident they should inform the other systems. Hospitals in the area are notified via the dedicated lines of communication with the Emergency Centres in the designated Hospitals.

- The information to be transmitted must contain the following data:
  - M – Major incident: YES or NO; Declared or Stand-by
  - E – Exact location
  - T – Type of incident

- H – Hazards identified or potential on scene
- A – Access routes for Emergency Services (including to / from Hospitals)
- N – Number of predicted patients
- E – Emergency services required [11]

The steps in management are followed by using the CSCATTT algorithm:

- C – Command and control (Command of own local resources and control with other services)
- S – Scene SAFETY – appoint a scene safety officer
- C – Communication: EMS main control
- A – Assessment: Provided as an updated METHANE report
- T – Triage: Triage sieve is performed until a forward casualty clearing station is set up where triage sieve and sort can occur.
- T – Treatment: Life-saving ABC treatment
- T – Transport: Decided by an appointed transport officer who, when to transport [11]

The researcher included the MIMMS and HMIMMS as per the clinical assessment since this is the approach currently being undertaken by the Department of Health in terms of FIFA standards and compliancy. However, from a public health perspective modified the study by adopting the Hyogo Framework for Action. This framework provides the benchmark for an international strategy for disaster reduction, and building the resilience of nations and communities to disasters. The Yokohama Strategy lies within this framework and is a well known Disaster Management Strategy and Action Plan. The Yokohama Strategy was tabled in Yokohama, Japan May 1994 at an International Strategy for Disaster Conference. [11] This strategy not only reflects upon disaster risk reduction, but also includes humanitarian, environmental and commitment to sustainable development, a public health significance which is deficient in MIMMS and HMIMMS.

The Yokohama Strategy involves lessons learned and gaps that need to be identified. This strategy sets guidelines for action on prevention, preparedness and mitigation of disaster risk. These guidelines were based on a set of principles that stressed the importance of risk assessment, disaster prevention and preparedness, early warnings and the capacity to prevent and reduce disasters.[12]

The emphasis is on a disaster risk reduction, which is one of several streams of activities to be planned and supported as part of the development. Secondly, considerations of disaster risk reduction are consciously built into the implementation of development programmes and policies. Thirdly, social eradication programmes are supported to improve coping strengths and resilience of institutions which directly contributes to reducing disaster risks.

The Yokohama Strategy as per the World Cup focuses on disaster risk reduction underpinned by approach to informing, motivating and involving people in all aspects of risk reduction, including the communities. It also highlights the scarcity of resources allocated specifically from budgets for the realization of risk reduction objectives, while noting the significant potential existing resources and established practices for more effective disaster risk reduction.

Specific gaps and challenges are identified in 5 main areas namely; governance in terms of organizational, legal and policy framework; risk identification in terms of assessment, monitoring and early warning; knowledge management and education; reducing underlying risk factors and preparedness for effective response and recovery

Taking these gaps into account, the development and strengthening of institutions, mechanisms and capacity levels, can significantly contribute to resilience to hazards.

### **2.3 Disaster and Mass Casualty Planning in a Hospital**

Hospitals would be among the first institutions to be affected after a disaster. Hospitals thus need to be in readiness because of the heavy demand placed on their services at the time of a disaster. The need for a well documented and tested disaster management plan is imperative to be in place at every hospital. To allow for mass casualty preparedness, hospitals have to expand their focus to include both internal and community-level planning.

The most important external agencies for collaboration would be district and local public health departments, emergency medical services, fire departments and law enforcing agencies such as the army. The hospital management team should be able to implement a procedure for managing resources and personnel during an emergency. A hospital's emergency response plan has to be evaluated whether that plan addresses these issues.[13] The hospitals in the United States of America are required to have disaster response plans accredited by the Joint Commission on Accreditation of Healthcare Organizations[13] which is imperative to assess the hospital's compliance to these policies.

The ultimate goal of health and medical intervention in response to a mass casualty event is to save as many lives as possible. To achieve this it becomes necessary to allocate limited resources in a modified manner. There has to be a shift to provide care and allocate scarce equipment, supplies and personnel in a manner that saves the largest number of lives in contrast to the traditional focus on saving individuals. It could even mean applying the principles of field triage to determine who gets what kind of care.[14] A shift could involve changing infection control standards to permit group isolation instead of single person isolation units. Hospitals can limit the use of ventilators to surgical situations. They could create alternate care sites in the waiting areas or corridors which are not

designed to provide medical care. This could also redefine who provides various kinds of care like enhancing the scope of nurses, physician assistants and hospital paramedics.[13]

Disaster medical response has predominantly focused on pre-hospital issues such as triage, evacuation and transport of casualties. It has also largely assumed that hospital management would occur as planned.[15] Hospitals across the world have limited bed capacity and staff are often unprepared for critical situations. They can be quickly overwhelmed in the event of a disaster such as after the terrorist bombing in Bali 2002, where fifteen patients requiring mechanical ventilation were sent to an Australian hospital which could only care for a maximum of 12 ventilated patients.[15]

Resources can therefore be repurposed from hospital patient safety to improve training and planning that can help the hospital staff. It can be argued that critical care professionals should be offered better disaster medical training. In addition, co-operation between hospitals in the vicinity of a disaster must improve. Planning and preparedness would allow for a better, more efficient exchange of material and human resources when needed. Thus more pressing needs would include education and training, and more detailed planning that acknowledges the specific disaster medical needs of hospitals and Intensive Care Units worldwide.

Another effective implementation in planning for disasters is the hospital disaster management simulation system. Simulating a disaster helps hospital staff to cope with the real scenario. Economical methods, based on simulation models, have been developed recently and used successfully in the regular planning and training programs used to prepare hospitals in Israel for conventional and non-conventional disasters.[16]

Both manual and computerized simulation techniques can be used. In both, a dynamic shell simulates and reflects the design and functioning of the hospital and the development of events. The advantages of a simulation are being able to identify personnel or lack of specific reinforcement personnel, specific medical equipment and electromechanical system problems. Other advantages include identification of crowds within the hospital and security problems. Simulation techniques can therefore assist in evaluating and improving preparedness of hospitals for managing a multi-casualty incident before a full-scale drill is completed.[17]

## **2.4 Hospital Disaster Plan**

The aim of every disaster operation plan is to keep the chaos or crisis period as short as possible. The public sector hospitals are usually the hardest hit with a huge number of patients. It may result in the practice of disaster medicine with a compromised quality of medical care. The implementation of a hospital disaster plan would be in the interest of a greater number of people surviving. The survival and recuperation of many patients is highly dependent on an appropriate and effective organization in the hospitals' designated disaster area.[18]

The purpose of a hospital disaster plan would be to provide policy for response to both internal and external disaster situations that may affect hospital staff, patients, visitors, and the community. An additional purpose would be to identify responsibilities of individuals and departments in the event of a disaster situation. Finally, a disaster plan must identify Standard Operating Guidelines for emergency activities and responses.

Some hospitals use a simple disaster operating plan that usually leads to a false assessment of requirements. In essence, special preparedness planning has to be in effect at the both the scene of disaster and the hospitalization area. A disaster plan, or '*organization for a mass admission of requirements*' a term coined by the Americans, is a pretentious project.[18] That being said, there is a possibility that a hospital itself could be afflicted by a major accident, making a special and well-working disaster plan imperative.

Disaster plans need to consider both external and internal disasters. The important goals in the event of an external mass disaster are to control the large number of patients and the resulting problems efficiently and effectively. The hospital disaster plan also needs to enhance the capacities of admission and treatment. Further goals include the treatment of patients based on the rules of saving many lives as possible and not focusing solely on the individual person. The organized and planned controlling of all additional tasks caused by such an event should be taken into consideration. Another goal to consider is the support to trauma and casualty areas by other departments in terms of medical consultation, medicaments, infusions, dressing material and any other necessary medical equipment.[18]

A hospital disaster plan should importantly consider an internal major accident such as a fire or an explosion. Another scenario could be the extension of an external disaster to become an internal disaster such as the bombing of a city and its hospitals. In the event of an internal disaster, the hospital disaster plan must strive to protect people, the environment and properties from damage. It is imperative that staff and patients receive the first and utmost protection. The disaster plan has to account for the re-establishment, as soon as possible, of an orderly situation enabling a return to normal work conditions. The internal disaster plans must consider an optimal protection of patients, employees and rescue personnel. It must ensure the required handling for a quick preparedness on bases of the daily organization structures. It must also guarantee a flexible and direct management at all times and an effective coordination of the available resources.[18] The basic requirements of a hospital disaster plan include special planning for both mass accident and damage area management. It implies that every hospital, regardless of its size and level of care, requires a well tried hospital plan.

In the times of a crisis, an additional need of immediate action arises and decisions have to be taken. The organization, structure of management and its leadership capabilities is very important. In the

event of a disaster, it is important to follow and adhere to certain principles. A clearly defined and small organization needs to be mobilized quickly. All management task teams must have clearly defined roles, actions and responsibilities. The disaster management headquarters must be predefined and a development on the existing base or foundation is much more important than re-organization. Management should also ensure that the remaining routine hospital work continues functioning.[18]

The emergency alarm needs to be quick, loud and reliable. The persons-in-charge of sounding the alarm need to be as low as possible in hierarchy, or else time is compromised during the early phases of the plan. Time is always the most decisive factor and will not be compensated. An alarm sounded late will inevitably result in a delayed mobilization which is irreparable. Alerting must never be a privilege of the hospital manager or the heads of departments, as they may be difficult to contact. The communication network which will be overcharged must not be additionally strained. Checklists may be the only successful formula.[18]

It is in my opinion and from previous management experience, on declaration of an emergency the hospital manager needs to consider the following

- The premature discharge of stable patients from the hospital;
- The transfer of patients who are almost stable to step-down facilities or the referring hospital;
- The cancellation and postponing of scheduled admissions such as those patients admitted for 24 hour blood glucose testing and elective operations such as those being scheduled for cataract removal or elective hernia repairs;
- To make available day care beds and operating theatres such as those used for plastic surgery and other elective procedures;
- The preparation and reservation of additional rooms;
- The mobilization of personnel from other departments that are not busy to the casualty and trauma areas that are highly taxing;
- Restrictions concerning visitors and patients needs to be in place not to create chaos;
- The cancellation of the alarm or state of emergency declared both for an internal and external disaster; and
- Instructions for the evaluation of an emergency.

Two common errors which may mislead the number of patients who are to be admitted in case of a mass disaster are; neither the number of beds nor the admission capacities are a decisive criterion and

the treatment capacities are under- or overestimated by the hospital.[18] The treatment capacity is the most important and can be defined by the available operating rooms and surgical teams as well as the availability of intensive care units. The numbers can be increased by cancellation of operations, consulting additional surgical teams and the premature transfer of patients from the intensive care units to the normal ward.

It is considered that one of the main issues which exist during major disasters is the lack of communication in general. The improper lines of communication fail at both an external and internal level if proper lines of communication are not in place or followed through. It can occur between stakeholders such as from one hospital to another or from hospitals to emergency paramedic services. Internal lack of communication can occur simply between surgeons, nursing staff or at the level of hospital executive management. Wire and radio contacts as well as messengers need to be integrated into the communication concept. Cellular phones often fail in these situations due to overcharge and eventually leading to network failure. No system is foolproof. A backup plan is always essential. Another important aspect of communication is the identification of staff in charge or leadership.

The media is a tremendous influence of communications and there is considerable media and public support for emergency measures. Sometimes the media can show a distorted view of the total situation such as the destruction of infrastructure and basic services which only creates more chaos.[19]

Internal and external information does not only include contact between rescue staff and media at the disaster area, it includes information flow within the hospital. Information chaos can only be prevented by a clear information concept. The information concept consists of information of staff, information of neighboring hospitals, ambulances, and the police. It also consists of information of friends and relatives and the media.[18]

Under the realm of medical and operational resources, the necessary departments such as radiology, anesthetics, blood bank, the laboratories, and pharmacies have to prepare for more extensive performances. Technical systems such as communication systems, power plant and medical gas supply may fail due to overcharge. During a disaster, one cannot go through large volumes of documents and policies. A simple and easy-to-use checklist must be made readily available.[20]

## **2.5 2010 FIFA World Cup Soccer**

The significance and magnitude of the 2010 Soccer World Tournament has already been expressed by the President of South Africa in his State of the Nation address where he made a clarion call to South Africans to ensure the successful hosting of this tournament. This is a historical opportunity not only for our Province or our country but the African continent as a whole. A lasting legacy has to be left after this tournament has been played on our shores.

The Soccer World Cup is a national event covering the entire country; six weeks in total with four weeks of tournament. It is expected that approximately 3.2 million tickets will be sold representing 600 000 to 800 000 ticket holders plus additional fans, the number unpredictable.[21]

The eThekweni District of the KwaZulu-Natal Department of Health needs to strategically position itself in such a way that it firstly contributes toward the successful hosting of this tournament by our country and ensure public health safety and security measures of the highest international standards and to thereafter sustain this standard which will not only be beneficial to our citizens during the tournament, but also in the event of future international mass gatherings.

Currently at a national level, a master policy document for the 2010 FIFA World Cup Soccer exists. The hospital designations and specifics of the stadium have been regulated and are protected.[10] The policy aims to guide host cities on matters such as preparation of hazard assessments. Other activities include working in cooperation with the Safety and Security Disaster Management, the undertaking of simulations and exercises as well as the creation of central capacity. It involves urban search and rescue, nuclear, biological, chemical and explosives capability as well as mass casualty capability. A new centralized joint operations centre with the South African Police Service will be utilized for the duration of the 2010 FIFA World Cup Soccer.

At a presentation made by South Africa to the FIFA's Executive Committee at the Trade Centre in Zurich on 14 May 2004, it was stated that nine host cities were selected and a pledge of ten stadiums were made. The eThekweni stadium (Moses Mabhida Stadium) in KwaZulu-Natal, Durban accommodates 70 000 spectators. In addition, the National Health Operations Centre which is in Pretoria will connect to all nine provinces, ensuring real-time monitoring through sophisticated information and communications technology systems linking to all official venues. This centre comprises an interdisciplinary partnership between the Department of Health, South African Defence Force, South African Police Services, Port Health Authorities, municipalities and environmental services.

Primary health care services will be provided for all spectators at official venues, including a script or referral to a health facility if warranted. All stadiums will include medical centres, medical posts for primary health care and personnel within the stadium and stadium precinct. At this stage, it is unknown if the medical facilities will be manned by the public or private health sector but a collaboration of the two sectors would be most appropriate for service delivery. Such provisions will also be in place in fan parks which are pre-defined areas created for spectators to view the matches on a large television screen and other World Cup related venues.

A process of appropriate hospital identification has begun which will include the assessment of certain hospitals specifically for the demands of the 2010 FIFA World Cup Soccer, as is designated by

the protocol. Categories will include hospitals designated for private, medical funded and public sector patients.

There is currently an existing government programme that will improve the delivery of the Emergency Medical Service to all communities. However, according to the committee, the Department of Health had embarked on the National Emergency Medical Services Strategy (a project to upgrade and enhance the Emergency Medical Services). The plan involved highly advanced communication centres established in major centres at a cost of R37 170 000 per province. It included a programme to replace about 450 emergency vehicles. The plan also involved medical helicopter services to cover all nine provinces. Eight million rands was invested to upgrade emergency centres designated for the World Cup.[21]

Further government programmes including a Disaster Management Mobile Unit will ensure on-site coordination of disaster relief and coordination with Municipalities. Security, ports of entry and protocol is another important issue. Airport management centres have been opened along with a control room with the South African Police Services to monitor operations at the airport. Improvement systems have been implemented on baggage handling to safeguard against drug trafficking, anthrax dangers and illegal trading.

The Department of Health has fast tracked an environmental impact assessment of all 2010 infrastructures through implementation of waste management campaign, anti-litter campaigns and initiatives to prevent trafficking in endangered flora and fauna. The development of projects in accordance to the environmental impact legislations is being monitored.

The Youth Volunteer Programme is an important unique opportunity for young people in our province to gain experience in a wider range of areas such as foreign language interpretation, call centre operation, tour guiding, marshalling and ushering. Not only does this assist in an already severely constrained skilled resource in South Africa, it is useful in providing the youth with a sense of responsibility, and diverting them away from harmful distractions such as drugs. On further basic life skills training and First Aid, they could prove useful to the designated hospitals for the 2010 FIFA World Cup Soccer.

The Provinces have also been tasked with provincial oversight committees and technical steering committees led by the Offices of the Premiers. The committees are responsible for disaster management, safety and security, health services, water and sanitation and electricity. An upgraded support structure will be overseen by the committee. Eskom has a dedicated 2010 task team that has measures in place to minimize interruptions in all 2010 projects. Generators will be used as the primary energy source in the stadiums with a consideration for storage of diesel and underground

tankers. The capacity of water and sewer treatment plants is being upgraded. In some instances, dedicated stadium-sub stations are being constructed.

In terms of budget and finances, the Public Transport Infrastructure and Systems Grant budget for the World Cup had been increased from R9.2 billion to R13.6 billion, as per the Budget statement of February 2008; eThekweni District itself had received R1.691 billion for its upgrades. This funding was a contribution toward linkages to the stadium, airport roads linkages M4, N2 and N3 upgrades.[21]which is imperative in terms of access to healthcare via transport.

Telkom's upgrade to its core fibre-optic network is in progress. This is important in terms of communication challenges in mass disasters and in instances where mobile services become overloaded with calls and are unreachable.

## **Chapter 3: Research Methodology**

### **3.1 Study Aim**

The aim of this study is to undertake a baseline survey to assess the state of hospital readiness, medical preparedness, and emergency care in preparation for the 2010 FIFA World Cup Soccer in the eThekweni District.

### **3.2 Study Objectives**

1. To determine if there are disaster plans, policies, alerting systems and communications in operation.
2. To identify the types of medical services and availability of emergency available.
3. To assess the structural capacity of the hospital in terms of designated emergency, theatre and isolation areas.
4. To determine the availability of emergency drugs and equipment necessary for resuscitation.
5. To determine the availability of human resources, their staffing and skills.
6. To make recommendations based on the results of the study that would enable the eThekweni District to be prepared for a mass disaster.

### **3.3 Type of Research**

The study is health systems research.

### **3.4 Study Setting**

The study was undertaken in all state hospitals and the two state-aided hospitals located within the eThekweni District of the KwaZulu-Natal Province.

### **3.5 Study Design**

The study design is an observational cross-sectional descriptive study.

### **3.6 Study Population Inclusion**

All district, regional, academic and state-aided hospitals were included in the study.

### **3.7 Study Population Exclusion**

All private hospitals, frail care homes, community health centres, primary health care clinics, and specialized care institutions (e.g. TB and Mental health institutes) were excluded.

### **3.8 Sampling Method / Size**

No sampling was undertaken as all nine public sector hospitals and the two state-aided hospitals within the eThekweni District were included in the study.

### **3.9 Data Collection**

The clinical approach used in the survey was the MIMMS and HMIMMS Strategy. The researcher had modified the questionnaire and checklist using the Yokohama Strategy from the International Hyogo Framework on Disaster Management whilst still maintaining the clinical approach of the MIMMS and HMIMMS. The modification includes governance where legal policies and framework are acknowledged, volunteers, community participation, translators, mortuary access and water and sanitation. Another important component included is knowledge management and education in the form of skilled healthcare professionals.

The Researcher was requested to undertake the survey for the eThekweni District, KwaZulu-Natal. (Appendix A).

Data collection encompassed a general assessment tool in the form of a standard questionnaire, with a checklist (Appendix B).

The research questionnaire included a checklist of equipment and drugs necessary in aid of resuscitation. The services offered in terms of operating theatres, type of medical services rendered, human resource and skills present, and the perceived needs, were identified at the institutions selected for the study.

Data for the study was collected by interviewing key informants at each institution by the researcher, and participants were informed on the purpose of the study (Appendix C and Appendix D).

Personnel interviewed included the Hospital manager, the Medical manager, and the Head of Trauma and Casualty.

All data from the questionnaires and checklist was categorized in terms of available physical and human resources, location and the relevant training skills in terms of mass disasters, as well as possible challenges faced for the 2010 FIFA World Cup Soccer in this regard.

Walk-through assessments were undertaken by the researcher to assess and confirm the various variables in the checklist and questionnaire.

### **3.10 Statistical Analysis**

Descriptive statistics was used to summarise and formulate a comprehensive overview of the information. The statistics involved summarization, distributions, central tendencies and measures of dispersion. The biostatistician at UKZN was consulted.

### **3.11 Pilot Study**

In September 2008, the researcher was requested by the eThekweni District Health Office to undertake a situational analysis of five hospitals in the eThekweni District as this was required by the FIFA Association. The findings were that the hospitals had been deficient in staff numbers, drugs and equipment and based on these findings, the researcher was mandated by the District Office to further investigate the readiness of the District's hospitals in the event of a mass disaster during the 2010 FIFA World Cup Soccer.

### **3.12 Reduction of Bias**

Selection bias was reduced by including all the district and regional public hospitals in the eThekweni District.

Information bias may occur as a result of no standardization of the skills training as attained by the health care workers.

The number of health care professionals present at the point of the study may not remain constant after the study and during the period of the World Cup Soccer.

It may be due to rotating doctors, as in the case of registrars who rotate through the hospital. Health care staff may transfer out of the hospital, may be on maternity, annual or sick leave.

The study also had other limitations which are discussed in Chapter 5.

### **3.13 Reliability**

Reliability of the study was maintained by standardized questionnaires/checklists.

The Researcher collected all data and completed all questionnaires/checklists.

### **3.14 Validity**

All criteria enlisted in the check list was cross-checked by walk-through visits, the provision of proof where necessary, e.g. copies of skills training to be ascertained, lists of equipment and drugs were submitted. FIFA has recognised certain internationally accepted and accredited training namely, ATLS (Advanced Trauma Life Support), ACLS (Advanced Cardiac Life Support), APLS (Advanced Paediatric Life Support), Basic Trauma Skills, MIMMS and HMIMMS.

### **3.15 Ethics and Permission**

Ethics approval and Postgraduate approval has been obtained from University of KwaZulu-Natal, Durban (Appendix F and Appendix G).

The study was also commissioned by the Department of Health, eThekweni District Office (Appendix A).

Permission to conduct the study was granted by all the hospital managers and medical managers.

Written permission from the hospital managers/medical managers has been obtained and submitted to the BREC, however in order to protect the anonymity of the hospitals, this information will not be inserted in the dissertation.

## Chapter 4: Results

### 4.1 Results for each Hospital

All eleven hospitals in the study were analysed in terms of sections A-E as per the checklist. The hospitals were categorised as tertiary, regional, small or large district hospital according to their levels of care. The data was entered in to Microsoft Excel and the data was assigned a score using one and zero, for yes and no respectively. All scores were added and summed to give a percentage score for each section.

**Table 1: Average percentage according to Sections in Hospital A (Tertiary Hospital) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	93
<b>Section B- Medical Services and Emergency Facilities</b>	100
<b>Section C- Emergency, Theatre and Isolation Areas</b>	72
<b>Section D- Drugs and Equipment</b>	90
<b>Section E- Human Resources</b>	90
<b>Mean</b>	89

The mean score of the sections for the hospital was 89%. The highest score was for Medical and Emergency services (100%) whilst the lowest score was for Emergency Theatre and Isolation areas (72%).

**Table 2: Average percentage according to Sections in Hospital B (Regional Hospital) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	87
<b>Section B- Medical Services and Emergency Facilities</b>	100
<b>Section C- Emergency, Theatre and Isolation Areas</b>	91
<b>Section D- Drugs and Equipment</b>	91
<b>Section E- Human Resources</b>	85
<b>Mean</b>	91

The mean score of the sections for the hospital was 91%. The highest score was for Medical and Emergency services (100%) whilst the lowest score was for Human Resources (85%).

**Table 3: Average percentage according to Sections in Hospital C (Regional Hospital) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	71
<b>Section B- Medical Services and Emergency Facilities</b>	94
<b>Section C- Emergency, Theatre and Isolation Areas</b>	45
<b>Section D- Drugs and Equipment</b>	86
<b>Section E- Human Resources</b>	65
<b>Mean</b>	73

The mean score of the sections for the hospital was 73%. The highest score was for Medical and Emergency services (94%) whilst the lowest score was for Emergency Theatre and Isolation areas (45%).

**Table 4: Average percentage according to Sections in Hospital D (Regional Hospital) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	73
<b>Section B- Medical Services and Emergency Facilities</b>	83
<b>Section C- Emergency, Theatre and Isolation Areas</b>	45
<b>Section D- Drugs and Equipment</b>	86
<b>Section E- Human Resources</b>	65
<b>Mean</b>	71

The mean score of the sections for the hospital was 71%. The highest score was for Medical and Emergency services (83%) whilst the lowest score was for Emergency Theatre and Isolation areas (45%).

**Table 5: Average percentage according to Sections in Hospital E (Regional Hospital) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	53
<b>Section B- Medical Services and Emergency Facilities</b>	83
<b>Section C- Emergency, Theatre and Isolation Areas</b>	45
<b>Section D- Drugs and Equipment</b>	86
<b>Section E- Human Resources</b>	65
<b>Mean</b>	71

The mean score of the sections for the hospital was 71%. The highest score was for Medical and Emergency services (83%) whilst the lowest score was for Emergency Theatre and Isolation areas (45%).

**Table 6: Average percentage according to Sections in Hospital F (Large District) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	60
<b>Section B- Medical Services and Emergency Facilities</b>	67
<b>Section C- Emergency, Theatre and Isolation Areas</b>	45
<b>Section D- Drugs and Equipment</b>	86
<b>Section E- Human Resources</b>	60
<b>Mean</b>	64

The mean score of the sections for the hospital was 64%. The highest score was for Drugs and Equipment (86%) whilst the lowest score was for Emergency Theatre and Isolation areas (45%).

**Table 7: Average percentage according to Sections in Hospital G (Large District) in eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	73
<b>Section B- Medical Services and Emergency Facilities</b>	47
<b>Section C- Emergency, Theatre and Isolation Areas</b>	45
<b>Section D- Drugs and Equipment</b>	64
<b>Section E- Human Resources</b>	65
<b>Mean</b>	59

The mean score of the sections for the hospital was 59%. The highest score was for Disaster plans, Policies and Communication (73%) whilst the lowest score was for Emergency Theatre and Isolation areas (45%).

**Table 8: Average percentage according to Sections in Hospital H (Small District) in the eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	73
<b>Section B- Medical Services and Emergency Facilities</b>	72
<b>Section C- Emergency, Theatre and Isolation Areas</b>	36
<b>Section D- Drugs and Equipment</b>	59
<b>Section E- Human Resources</b>	50
<b>Mean</b>	58

The mean score of the sections for the hospital was 58%. The highest score was for Disaster plans, Policies and Communication (73%) whilst the lowest score was for Emergency Theatre and Isolation areas (36%).

**Table 9: Average percentage according to Sections in Hospital I (Small District) in eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	73
<b>Section B- Medical Services and Emergency Facilities</b>	89
<b>Section C- Emergency, Theatre and Isolation Areas</b>	82
<b>Section D- Drugs and Equipment</b>	95
<b>Section E- Human Resources</b>	70
<b>Mean</b>	82

The mean score of the sections for the hospital was 82%. The highest score was for Drugs and Equipment (95%) whilst the lowest score was for Human Resources (70%).

**Table 10: Average percentage according to Sections in Hospital J (Large District) in eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	73
<b>Section B- Medical Services and Emergency Facilities</b>	89
<b>Section C- Emergency, Theatre and Isolation Areas</b>	82
<b>Section D- Drugs and Equipment</b>	95
<b>Section E- Human Resources</b>	70
<b>Mean</b>	82

The mean score of the sections for the hospital was 82%. The highest score was for Drugs and Equipment (95%) whilst the lowest score was for Human Resources (70%).

**Table 11: Average percentage according to Sections in Hospital K (Small District) in eThekweni District in 2009**

<b>Sections</b>	<b>Average Percentage</b>
<b>Section A- Disaster plans, Policies and Communication</b>	60
<b>Section B- Medical Services and Emergency Facilities</b>	93
<b>Section C- Emergency, Theatre and Isolation Areas</b>	55
<b>Section D- Drugs and Equipment</b>	82
<b>Section E- Human Resources</b>	50
<b>Mean</b>	68

The mean score of the sections for the hospital was 68%. The highest score was for Medical and Emergency services (93%) whilst the lowest score was for Human Resources (50%).

**Table 12: Average percentage of each of the 11 hospitals in the eThekweni District in terms of the variables assessed in 2009**

<b>Hospitals</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>
<b>Average (%)</b>											
<b>Section A</b>	93	87	71	73	53	60	73	73	73	73	60
<b>Section B</b>	100	100	94	83	83	67	47	72	38	89	93
<b>Section C</b>	72	91	45	45	45	45	45	36	36	82	55
<b>Section D</b>	90	91	86	86	86	86	64	59	77	95	82
<b>Section E</b>	90	85	65	65	65	60	65	50	30	70	50
<b>% Total</b>	89	91	73	71	71	64	59	58	51	82	68

**n = 11 (the total number of public sector hospitals in the study)**

Key:

Section A- Disaster plans, Policies and Communication

Section B- Medical Services and Emergency Facilities

Section C- Emergency, Theatre and Isolation Areas

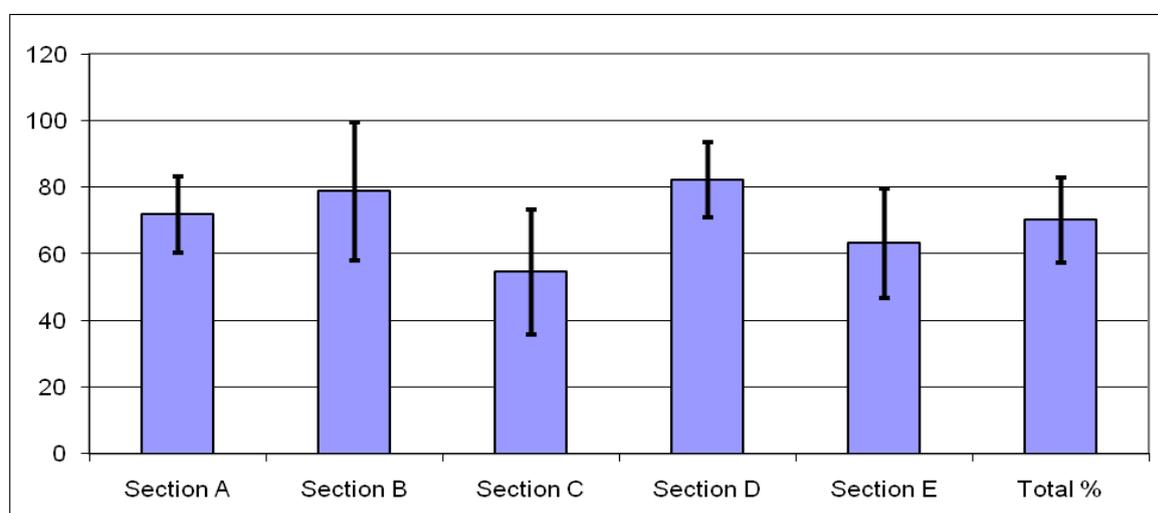
Section D- Drugs and Equipment

Section E- Human Resources

**Table 13: Average percentage of an overview of the mean and the standard deviation of the variables scored by averaging the 11 hospitals in the eThekweni District in 2009**

<b>% Target</b>	<b>Mean</b>	<b>Standard deviation</b>
<b>Section A- Disaster plans, Policies and Communication</b>	72	11
<b>Section B- Medical Services and Emergency Facilities</b>	79	30
<b>Section C- Emergency, Theatre and Isolation Areas</b>	55	19
<b>Section D- Drugs and Equipment</b>	82	11
<b>Section E- Human Resources</b>	63	16
<b>% Total</b>	70	13

The upper and lower mean were commuted and a standard deviation was assigned to the respective sections (Figure 1). Anonymity of the hospitals has been maintained.



**Figure 1 : The overview of the total percentage response to all variables assessed in the 11 hospitals in the eThekweni District in terms of standard deviation, the upper and lower mean in 2009**

Key:

Section A- Disaster plans, Policies and Communication

Section B- Medical Services and Emergency Facilities

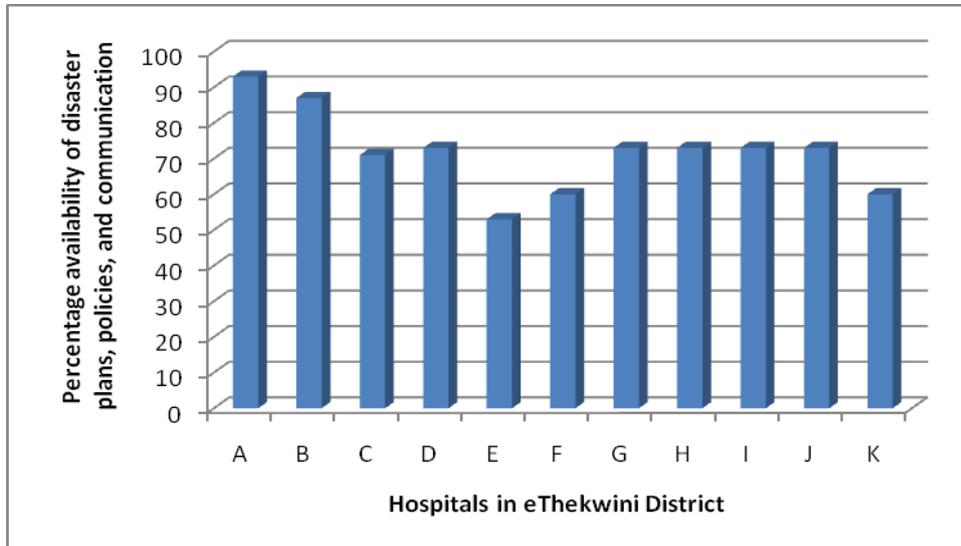
Section C- Emergency, Theatre and Isolation Areas

Section D- Drugs and Equipment

Section E- Human Resources

The total percentage response to each of the variables from the five sections was calculated summing all eleven hospitals (Figure 1). In Section A (Disaster Plans, Policies and Communication), the hospitals scored a total mean of 72%, with the upper mean (83%), lower mean (61%), and standard deviation (11%) that was calculated. In Section B (Medical Services and Emergency Facilities), the hospitals scored a total mean of 79%, with the upper mean (99%), lower mean (58%), and standard deviation (21%) that was calculated. In Section C (Emergency, Theatre and Isolation Areas), the hospitals scored a total mean of 54%, with the upper mean (73%), lower mean (35%), and standard deviation (19%) that was calculated. In Section D (Drugs and Equipment), the hospitals scored a total mean of 82%, with the upper mean (94%), lower mean (71%), and standard deviation (11%) that was calculated. In Section E (Human Resources), the hospitals scored a total mean of 63%, with the upper mean (80%), lower mean (47%), and standard deviation (16%) that was calculated.

#### 4.2 Section A – Disaster Plans, Policies and communication



**Figure 2: The percentage availability of disaster plans, policies and communication in the hospitals in eThekweni District in 2009**

All hospitals in the study indicated that they have disaster plans and clinical governance programmes. An average of 90 % of hospitals has disaster plans **in practice** with disaster co-ordinators. The smaller district hospital has no disaster plan in practice or disaster co-ordinator. They further indicated a lack of a medical health and safety officer.

All hospitals indicated that notification plans were present and were all using an emergency drill system. Majority of the hospitals (85%) indicated that they practiced the drill system on a weekly basis whilst two hospitals practiced the drill system monthly (Figure 2). The majority of the hospitals (70 %) of the regional and larger district hospitals have action card notifications in situ. The action cards are colour coded and contain the hierarchy of authority for the various members of a major incident response. One of the tertiary hospitals has an organised system of listing the card duties in order of priority. The duties are delegated according to staff availability. The importance of this system being that it is necessary to understand that in a major incident, the best control is by instruction rather than discussion and consensus as time is of the essence.

At least 90 % of hospitals indicated plans to initiate a system of recalling staff back on duty. The tertiary hospitals have a 'taxi system' which provides transport to fetch staff from their residential areas. Most tertiary and regional hospitals (70%) have a manual and electronic database of their staffs contact details. The regional and larger district hospitals have doctors and nurses quarters on site, which makes immediate emergency response more efficient.

All hospitals have internal disaster plans for internal emergencies. Only 45 % hospitals indicated that they had the capacity to supply resources and personnel in response to an external disaster. The other hospitals indicated that at present, they were just trying best to operate fully with the current resource capacity, which still is inadequate. Most hospitals (70%), mainly the district hospitals reported a shortage of beds in casualty, trauma and other departments.

The reported current system of identifying and occupying the number of beds that exists within the eThekweni District is as follows:

1. Bed status at each institution is enumerated manually and faxed to other institutions and the PHOC (Provincial Hospital Operations Centre).
2. The system is non-standardized (institutions fax bed status to each other or the PHOC, and some institutions do not engage in any communication with the PHOC and their counterparts).
3. The bed status is entered using a proforma where male and female beds in the different disciplines are determined.
4. The proforma identifies the male and female beds in the various disciplines of Medicine, Surgery, Orthopaedics, Obstetrics and Gynaecology, Paediatrics, ICU, High care and CCU.
5. No reference is made to the nursing staff numbers or doctors on call.

6. The transfers are discussed between consultant to consultant at some hospitals, and at times between hospital and medical managers, which is not standardized across the District.

Less than half (45%), predominantly the tertiary and larger district hospitals, had indicated separate entries to the Emergency Centre for contaminated patients. Only 54% of hospitals have a dedicated decontamination area, whilst 63% indicated just cold water supply to the decontaminated area. Just two hospitals have water run-off from the decontamination area to be contained. Some hospitals (40%) suggested the outsourcing of a portable decontamination device if necessary, whilst other hospitals (60%) indicated the use of biocide to disinfect the area draining. Most hospitals (70%) have the water run-off from the decontamination area into its sewer line, whilst one of the tertiary hospitals has the wash area adjacent to the Trauma area to restrict contamination of its hospital.

Communication is an important variable but only 27% of the hospitals, predominantly the larger regional hospitals, have a base-station radio-link with EMRS. One tertiary hospital has the facility present for radio-link communication, but no linkage is as yet established to EMRS. It would be problematic especially in the event of an overload in network coverage where the mobile network could fail. In addition, some smaller outlying rural district hospitals indicated that in some areas, there is absolutely no network coverage at all.

Although 81% of the hospitals indicated the closest airport as either Durban International or Virginia Airport, these results will change, since the study has not accounted for the relocation of the Durban International Airport, at least a further 45 minutes away from its current location. In addition, 55% of the tertiary, regional and larger district hospitals have access to a helipad.

### 4.3 Section B – Medical Services and Emergency Facilities



**Figure 3: The percentage availability of medical services and emergency facilities in the hospitals in eThekweni District in 2009**

All hospitals have the entrance doors manned 24 hours per day with illuminated and clear signage to the entrance. Signage with clear instructions is very important, especially in those who are physically disabled as in the deaf and dumb, and foreigners.

Only 72% of hospitals have a Triage System or Triage Sieve to determine the priority emergency cases (Figure 3). The Triage Sieve is colour coded into four primary colours. Red codes are those patients with life-threatening injuries and they are not walking or breathing. Yellow codes are those patients unable to walk, but breathing with a pulse or a pulse of normal rate. Green codes are all walking wounded patients irrespective of their injury type. Blue codes are those patients whom are unlikely to survive or already dead and either need comfort care or transfer to mortuary.

There are on average, 43 trolleys and 50 wheelchairs in the hospitals. However these figures are not constant, since some wheelchairs (30%) are on loan to disabled patients being discharged from the hospital. Some trolleys and wheelchairs are not suited for use, but are being used due to budget and financial constraints.

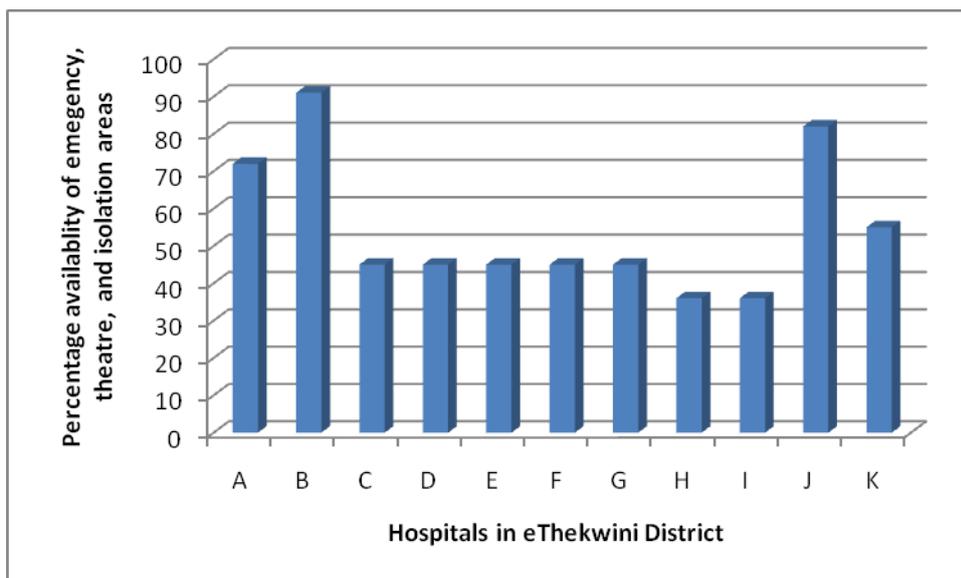
**Table 14: The average percentage of the different emergency services delivered by the 11 hospitals in the eThekweni District in 2009**

<b>Medical Services Delivered</b>	<b>Mean Percentage</b>
<b>Emergency Medicine</b>	91
<b>General Surgery</b>	82
<b>Anaesthesia</b>	91
<b>Trauma Surgery</b>	45
<b>Orthopaedic Surgery</b>	55
<b>Intensive Care/High Care</b>	72
<b>Internal Medicine</b>	82
<b>Obstetrics/Gynaecology</b>	82
<b>Paediatric Surgery</b>	45
<b>Paediatrics</b>	91
<b>Radiology</b>	91
<b>Psychosocial support services/councillors</b>	100

In the category of medical services, the hospitals scored 80% and above for the services offered such as; Emergency Medicine, General Surgery, Anaesthesia, Internal Medicine, Obstetrics and Gynaecology, Paediatric Surgery, Paediatrics, Radiology and Psychosocial support services (Table 14). However, only 45 % of hospitals, mainly the tertiary and regional hospitals, offer Trauma and Orthopaedic Surgery. The hospitals weighted 72% in terms of having either Intensive Care or High Care services being delivered. One of the larger district hospitals has theatres and facilities available for Orthopaedic and Trauma use, but lack the necessary skilled staffing to make the units operational. Two of the smaller district hospitals provide ophthalmology, plastics, urology and paediatric surgery, only as elective cases and do not have an emergency and trauma unit.

More than 90% of the hospitals have X-Ray services on site that is 24 hour operational. However only 27% of the hospitals have CT Scanning and 36% have Ultrasound services which are 24 hour operational.

#### 4.4 Section C – Emergency, Theatre and Isolation Areas



**Figure 4: The percentage availability of emergency, theatre and isolation areas in the hospitals in eThekweni District in 2009**

At the level of the General Treatment Area, the hospitals (40%) stated that there was a need for increased space for staff, equipment and activity. An average of 45% of the larger district hospitals reported having inadequate operational space. Some hospitals (40%) have had their casualty and trauma space extended into outpatient working areas, due to the overflow of incoming patients far exceeding the hospitals' bed status (Figure 4).

Only 45% of larger district hospitals indicated the presence of observation beds in gender-defined wards of good functional condition. Some hospitals (30%) further stated that other wards such as the Psychiatry wards, are converted into observation wards should the need arise. A total of 90% of hospitals have a dedicated resuscitation area and 73% have 24 hour operating theatre facilities for major trauma. One must also realise again, that some hospitals have the infrastructure, but lack the staffing needed to operate the unit.

One hospital does not include an outpatient resuscitation unit, because it does not have a casualty/trauma unit onsite and provides only for elective theatre cases. This smaller district hospital has elective theatre schedules only, and although it does not function as a 24 hour service, it can be considered for major trauma, since it includes fully equipped theatres and intensive care units for specialised areas such as ophthalmology and urology.

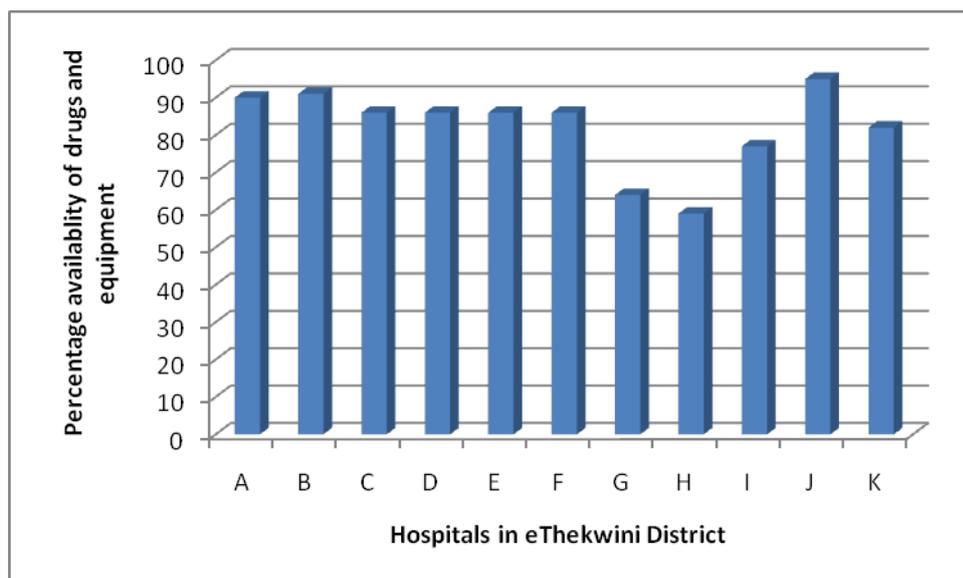
The hospitals scored 72% on the variable of having intensive care or high care units. The larger regional hospitals, on average have three functioning ICU beds with ventilation, and five functioning High Care beds. However, within this critical care variable, grey areas that were identified were the conversion of ICU units to High Care units, due to either the lack of trained and skilled staff, or simple technicalities such as the lack of oxygen points near the beds, which then render the unit non-functional.

The larger regional and tertiary hospitals indicated a Private-Public Partnership between their hospital and that of a nearby private hospital in terms of ICU bed buy-outs in times of crisis. In addition, one hospital has an emergency medicine specialist. Some hospitals (30%) have complained of an antiquated air-conditioning system, which does not function at times. It thus poses a threat for creating a medium for harvesting infections, which in the case of theatre cases, is not very hygienic.

Only one regional hospital has an Isolation Unit. This hospital is set to have a new isolation unit which is being commissioned to comply with FIFA standards. The only other public healthcare isolation unit near eThekweni is in Edendale Hospital, about an hour away. There is therefore only one hospital in the District which can accommodate the adverse events of outbreaks such as international communicable diseases like the H1N1 virus (swine flu), avian flu and haemorrhagic fevers. Two hospitals indicated healthcare professionals with isolation skills training, but there is no infrastructure present.

All hospitals have emergency power for all essential equipment. The larger tertiary hospital has an organised system of an uninterrupted power supply, where the generator trunkings are colour-coded accordingly from basic to emergency.

#### 4.5 Section D – Drugs and Equipment



**Figure 5: The percentage availability of drugs and equipment in the hospitals in eThekweni District in 2009**

The hospitals scored an average of 82%, especially the larger district and regional hospitals, having met the requirements for the necessary drugs and equipment as per standard emergency guidelines (Figure 5). A shortage of the following resuscitation equipment was noted; Pocket masks, End-tidal CO<sub>2</sub> determination and thermal control equipment for bloods and fluids in high capacity and fluid warming. The hospitals fell short by at least 70-80% in this area. End-tidal CO<sub>2</sub> measuring equipment is used mainly in theatre, but only 25 % hospitals had it available in the resuscitation bays.

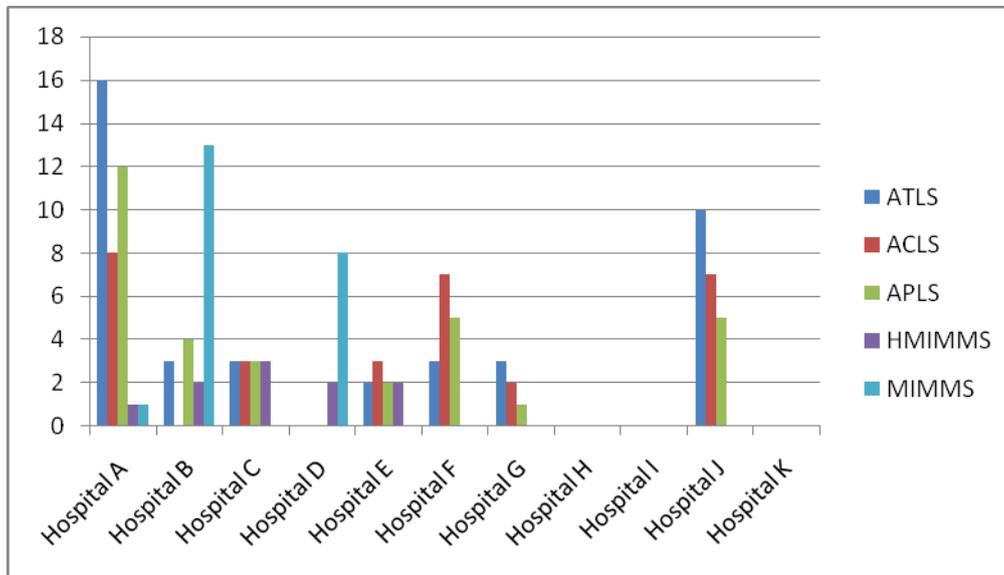
The hospitals indicated that some equipment (10%) is functional due to the inclusion of other parts of equipment, not belonging to the set. Some equipment (20%) is outdated and needs replacement. Some (15%) are being utilised, even though having faulty mechanisms. An example of such a case is the use of a faulty paediatric laryngoscope without a light, in areas of paediatric surgery due to the shortage of this piece of equipment, and no funds available for replacement thereof. Smaller district hospitals (20%) have complained of faulty sphygmomanometers that have not been replaced for months.

Hospitals complied by having a full complement of the emergency drugs as per standard guidelines in cases of mass emergencies. Hospitals (40%) also reported having severe drug shortages during 15 % of emergencies due to the slow turnaround time in replacing the drugs.

#### 4.6 Section E – Human Resources

One of the most important factors to consider in any mass event is the staffing and skills training of the healthcare sector. The 24 hour coverage of both doctors and nursing staff was investigated. On average, there are three doctors and four professional nurses that cover a call at the larger regional

hospitals. The smaller district hospitals complained of a shortage of both doctors and nursing staff on a 24 hour call. At times, there is only one medical officer and two enrolled nursing staff at the casualty and trauma units.



**Figure 6 : The total number of doctors in each of the 11 hospitals in the eThekweni District with skills training ATLS, ACLS, APLS, MIMMS and HMIMMS respectively in 2009**

Skills training pose a great problem with most of the nurses and doctors having undertaken the ATLS, ACLS, and APLS courses, but some (40%) of their certificates are currently expired. It has to be renewed every two years (Figure 2). There is a significant need to increase the numbers of APLS and ACLS especially in some (60%) of the district hospitals, wherein there are no doctors having the mentioned skills certificate and training. The larger tertiary hospital has 40% of the chunk of doctors with ATLS, 27% ACLS, and 38% APLS within the eThekweni District. The larger district hospitals have an average of 10% doctors skilled in ATLS, 7.5% ACLS and an alarmingly low 4% APLS within the public sector. These percentages may even decrease as 20% of the doctors taken into account are postgraduate registrars in training, who rotate in the hospital throughout their service delivery.

**Table 15 : The types of skills training undertaken by the total number of doctors and nurses with valid certificates in the 11 hospitals in the eThekweni District in 2009**

<b>Skills Training</b>	<b>Total Number of Doctors/Nurses</b>
<b>ATLS</b>	40
<b>ACLS</b>	30
<b>APLS</b>	32
<b>HMIMMS</b>	10
<b>MIMMS</b>	22
<b>Basic Trauma Skills</b>	9
<b>Isolation Procedures</b>	4

A total of 10 healthcare professionals attended the HMIMMS training, which was offered to predominantly managers of the units and hospitals, whilst a further 22 healthcare professionals attended the MIMMS training (Table 15). These doctors that attended the MIMMS training were predominantly from trauma/casualty units and management. However two of the regional hospitals have no healthcare professionals with MIMMS training. There are no doctors in the smaller district hospitals with MIMMS or HMIMMS training (Figure 2).

The eThekweni skilled headcount then stands at; 40 Doctors with ATLS, 30 with ACLS, 32 with APLS, 10 with HMIMMS, 32 with MIMMS, and the major proportion of these found largely at the tertiary and regional hospital level (Table 15). Only nine nursing staff within the District's public healthcare sector, has Basic Trauma Skills training and that too within the larger regional and tertiary hospitals. Four senior professional nursing staff are equipped with isolation procedure techniques, however just one of these nurses is employed at the larger regional hospital with the isolation unit. One nurse is employed at the tertiary level, one at a larger district hospital, and the last nurse at the small district hospital.

The Medical Manager of the larger tertiary hospital had indicated a Private-Public Partnership in terms of outsourcing their cleaning services, laundry and catering services. The state-aided hospitals had also adopted this approach of outsourcing to the private sector thus reducing the costs on their budget.

Volunteer groups and community participation form an important integral within any mass disaster. A total of 80% of hospitals have access to some sort of volunteer group and 63% of the hospitals have indicated an affiliation to community participatory organisations. These volunteer groups and community organisations are predominantly in the form of women's social circle groups, church organisations, temple and missionary organisations, and other youth and religious groups which are on some of the hospitals' database. Non-governmental Organisations such as the Red Cross are also affiliated to the hospitals.

During an international event, one of the most common problems that exist is the language barrier. Half of the hospitals (54%) indicated access to translators. The larger regional hospitals have a database of translators, not just from outside the hospital, but also within the hospital due to the employment of foreign healthcare professionals as well.

During massive disasters, having a mortuary onsite is imperative in assisting with the containment of demised patients, especially so as to create more bed space for severely injured. All the hospitals indicated a mortuary on-site, except the smaller district hospital, which does have direct access to the town morgue.

An international event equally implies the introduction of foreign medication into the country by visiting foreigners. All hospitals have access to the Drug and Poison Centre via direct telephonic line to the unit at a private hospital in the central District. This unit provides advice on substance abuse, accidental overdose or even allergic anaphylactic complications.

Water and Sanitation, although rarely looked at in terms of a mass disaster, is equally an important variable. During international events, the threat of bio-terrorism with water and chemical warfare exists. Therefore the researcher considered this variable in the public health approach. A risk of communicable diseases, such as cholera, can equally impact the hospitals water supply. The researcher investigated the possibility of safe drinking stored water and access to portable toilets.

A total of 72% of the hospitals have a storage tank onsite. Two of the regional hospitals (40%) reported risks with the tanks. One of the larger regional hospitals had the presence of rats within the tank of stored water, whilst another of the smaller regional hospitals have a very old storage system where the filter has fungus and hasn't been changed in years. The stored water of the smaller district hospitals were found to be quite well stored and safe to drink. The presence of water boreholes and springs around the smaller district hospitals can be equally considered in terms of a reservoir for drinking water in times of a crisis. None of the hospitals have portable toilets onsite, with few having indicated that should the need arise, these toilets would be outsourced.

All hospitals have back-up generators in the event of a power failure. Some hospitals (60%) had systems installed and tested due to the recent power supply electricity disruptions experienced. Two hospitals complained of an old generator mechanism. At least 60% of the hospitals test their generators regularly with load filling and testing. The generators are mainly used for essential equipment, emergency equipment, theatres and elevators. Each generator at 80% of the hospitals is checked and recorded on log books in terms of their battery charger, battery water, voltage, oil level, water level and leaks.

## **Chapter 5: Discussion**

### **5.1 Section A- Disaster Plans, Policies and Communication**

#### **5.1.1 Disaster Plans, Management and Administration**

The most important factor in the preparation for any mass event is a well designed, tried and tested disaster plan and policy.[22] The hospitals met a compliancy of 72% with a standard deviation of 11.5%. The plans are well-structured and have been reviewed by the Provincial Task Team. However some hospitals, especially the smaller district hospitals, do not have an adequate plan, which needs to be specific for each institution to be compliant to 2010 regulations. The external disaster management needs to be very clearly outlined according to international guidelines as described by MIMMS or HIMMS, which has been the clinical audit tool used in the preparation of disaster risk management. Some of the smaller district hospitals have disaster plans, but are very outdated and this must be reviewed.

Most of the components of the plan are evident as recommended by the Department of Health. The main evacuation procedure needs to be included for every unit in the regional hospitals and it is essential to include disaster exercises at least twice before the 2010 FIFA World Cup Soccer. Exercise reports or scheduled exercises need to be planned and documented. Some of the disaster guidelines mentions certain stages of alert but does not explain the definitions clearly for mass casualty plan. Mass casualty patient flow maps need to be included indicating all areas involved in disaster. Some of the hospitals need to include evacuation maps for all units indicating exits and fire extinguishers.

Specific disasters need to be included in the plan in the event of outbreaks, chemical spills and any locally identified hazards.[22]

The absence of disaster committees in some of the smaller district hospitals will impact on the eThekweni District in the event of a mass disaster. The absence of committees makes it difficult to establish all aspects of internal disaster that has to be adapted for that particular hospital. Disaster committee meetings are updated regularly in the district and some regional hospitals and helps establish shortfalls. The smaller district hospitals do not have their disaster plans reviewed frequently by the committee in terms of a clear explanation on how their plan is both activated and undertaken. All meetings should be held much more frequent especially towards the soccer event and the minutes of each meeting need to be clearly outlined, as this is not evident in some hospitals.

Effective corporate governance, management and leadership begin with understanding the various responsibilities and authority of individuals in the organization, and how these individuals work together.[22]

Clinical governance is the process by which the leaders support and take accountability for the clinical activities of the centre. This involves measurement of activities through clinical audit, adverse events monitoring and quality improvement activities.[23] All hospitals showed the presence of a corporate governing body.

Good departmental performance requires clear leadership from qualified individuals and the responsibilities of these individuals must be clearly defined. In central centres, responsibility for emergency care may be shared between several medical practitioners; and trauma, emergency medicine and paediatric emergencies may be considered separate disciplines.

A specialist qualification in surgery, medicine, emergency medicine or paediatrics is important. Specialists responsible for clinical activities in the emergency centre should have appropriate emergency qualifications (Dip PEC, ATLS, ACLS, APLS or equivalent). In district or regional centres, either a Dip PEC; or ATLS plus ACLS (or equivalent) plus a paediatric CPR qualification are considered appropriate training for a non-specialist unit head.[23] There is a clear lack of specialists with the above qualifications with only 25% of the hospitals having specialists meeting the above criteria.

The process of admission and registration of patients may not be performed due to the lack of time. There are no simple and ready-for-use systems in 50% of the hospitals or even a method which enables to relate patients clearly to the event such as for investigation authorities. There are also no reliable identification system of the patients' personal belongings and a method that enables relatives to find the patient in the hospital in 40% of the hospitals.

### **5.1.2 Communication networking**

Communication is vital and its structure needs to be specific for each hospital.[22] The hospital database and file should be readily accessible and user-friendly. One should be able to know who to call and what to do even during the early hours of the morning. Telephone numbers for key people such as hospital disaster committee staff and provincial bodies are lacking in some of the databases.

There needs to be a strengthened communication network between the EMRS, public sector hospitals and private sector hospitals. It is imperative for all the hospitals to be linked to the EMRS via radio-control basis. Some hospitals lack this and may be impacting in the event of cellular network overload and telephone landlines are disrupted.

The strict adherence to the referral pathway is imperative to eliminate overload on other hospitals, however in terms of a mass disaster, all hospitals should have a good understanding and communication to become inter-dependent so as to resolve the crisis efficiently and effectively. Screening of the patients by EMRS and the correct hospital transfer is important. There are some grey

areas in the system where the EMRS for Durban Metro is controlled by Ilembe District. One of the hospitals in the eThekweni catchment borders on the Indendwe District so patients from this catchment area are transferred to this small district hospital from another catchment area, and impacts this hospital's budget and resources.

A strong intercollaborative partnership needs to be fostered between the public and private hospitals, between each public hospital, and between each department.[22] At least 20% of the hospitals have indicated outsourcing of their laundry, housekeeping and catering services to the private sector. The larger regional hospital had formed a Private-Public Partnership with a private hospital in terms of ICU bed buy-outs when they are in ICU bed shortage. Good communication and understanding can help promote a strong teamwork which is imperative in the managing of a mass disaster.

Formal methods (standing committees, joint teams), and informal methods (newsletter, posters) are developed to promote communication among services and individual staff members. Relevant community members become part of the communication network. Co-ordination of clinical services comes from an understanding of the services of each department, and collaboration in the development of policies and procedures.[23]

A particular area where coordination of services is necessary is the capability for mechanical ventilation. In primary and district centres, a portable ventilator in the emergency centre is possibly the only ventilator in the facility and access to it may be required for patients already hospitalised. It will be primarily used for the stabilisation of patients awaiting transfer to a regional or tertiary hospital to a higher (specialised) level of care.

In public sector regional and major centres, the demand for ventilated beds often outstrips resources and patients may need to be returned to the emergency centre for post operative ventilation when no intensive care beds are available. In order to optimise use of ventilated beds, not only is coordination between the facility's emergency centre and ICU required, but also a system wide strategy, which defines the ventilator requirements of individual facilities and coordinates the use of these facilities across a system. Currently, a bed buy-out exists where patients can be transferred from the public hospitals to the private ICU, if there are shortages ICU beds at a public hospital.

There is communication and co-operation between governance, management and other provider organizations in the community in 70% of the hospitals. There is co-ordination and integration of care planning and delivery with other departments and services in all hospitals. There is a strategy for the management of ventilated patients, which is coordinated with other facilities in the health system in all the district and regional hospitals. The integrated communication is important as it serves to reduce the risk of disorganisation within the hospitals thus each department and hospital will be aware of

what its needs and demands will be at the point of disaster in order to facilitate prompt handling of the disaster.

### **5.1.3 A Central Bed Bureau**

There is a clear need for a central bed bureau. This is a central unit where all the information of the bed status of the hospitals is conveyed. The operators can then view the bed status at a glance making this easier to see which hospitals have reached their full capacity thus directing the ambulances to the assigned hospitals. The Bed Bureau has been in existence since 1948 in Sheffield Regional Hospital Boards in United Kingdom.[24]

The limited number of beds available at any given time at an institution poses a problem for patients, hospital management and clinical staff, as well as the ambulance services, working in limbo to transport a patient. The ready availability of beds therefore has widespread ramifications in terms of backlogs on service delivery, long waiting times and poor patient outcomes.

Management spend long hours in negotiations with other institutions trying to find a bed outside of that particular drainage area, if one does not exist within that institution and drainage area. A centralized bed bureau would therefore appear to be the most viable solution where at any given time, the numbers of both intensive care and general beds in all disciplines are known in a real-time mode, and authority to make decisions that will be upheld is vested in an individual trained to make the most appropriate decision.

The concept of a bed bureau is not new. Intermittently, reference is made as far back as 1948.[24] This model was based on an admission and discharge criteria. A number of local changes, for example, adoption of a centralized bed bureau, together with policy changes, initiated a nurse-led practice development project. It was predicted that by creating a framework for more formalized communication between the different disciplines admission and discharge processes would be improved, thus enhancing service users' satisfaction and empowering all staff participating in the process.

In addition, a letter to the editor published in a British journal, stated that a national bed bureau for intensive care beds was established on 1 December 1996 in the NHS to simplify the problem of finding a suitable bed for a critically ill patient should local facilities be either unavailable or inappropriate.[25] The fact that such a facility was urgently needed confirms that there remains a shortage of intensive care (and not high dependency) beds in the right place at the right time.

Although it is appropriate to use intensive care beds at maximum efficiency, knowledge of the whereabouts of a bed was only part of the solution. The dangers of transferring critically ill patients needed to be emphasized. Safe transport required trained and experienced staff; appropriate

equipment; and a resuscitated, stable patient. The patient that was being transferred occupied the equivalent of an intensive care unit bed in a vehicle, and during transfer he or she required the full capabilities of an intensive care unit team.[26]

A Bed Bureau can thus be defined as a service to enable referral of acute emergencies to hospitals saving them time and multiple phone calls as a result of difficulties with hospital switchboards and booking transport. The Bed Bureau as part of the wider capacity management system will also ensure that patients go to their local hospitals in the majority of cases, but also secure a referral to other hospitals in the event of hospitals experiencing operational difficulties, example crises such as bed shortages or disaster management e.g. strikes and tsunamis.

The rationale behind the current system is that hospitals can determine shortfalls in beds and make contingency plans timeously. The reality is unfortunately different in that other hospitals are also overcrowded with no available beds. PHOC continues to transport patients to hospitals within that of the patient's drainage area regardless of the information that there are no beds available. The bed status changes due dynamic factors within the institution. Although the patient is discharged, they may not have physically left the bed so in reality the physical number of beds would be different from the actual number of beds.

The two larger regional and tertiary hospitals are the only hospitals that can generate a verifiable real time bed status because of their Health Information Systems which functions optimally and efficiently.

An establishment of such a facility will alleviate the bed shortage status of the hospitals. The smaller district hospitals can serve as step-down facilities, but issues of patient transfer, admission and discharge criteria presently in-situ and the medical staffing of the hospitals to manage inpatients, remains a problem. Medical Officers are also not a permanent part of some of the district hospitals and are subjected to rotations at other institutions which compound the problems further.

Appropriate admission criteria can be defined (i.e. patients that require a lower level of care, intermediate to the hospital facility care and actual discharge home, be admitted. At present, it appears that criteria are so stringent, patients are actually well enough to go home. ICU beds have not been discussed in the central bed concept since the system of 'buy-out' of beds exists, and there are internal, informal agreements made between institutions on transfer to ICU.

## **5.2 Section B-Medical Services and Emergency Facilities**

An important element of the assessment concerns initial prioritisation on the basis of urgency, or "triage". [23]Following a more formal assessment, patients will be treated and discharged, admitted, or transferred.

Emergency care should be rapidly initiated in order to prevent death or disability. One of the constraints in resource poor health systems is providing access to emergency care to those who would otherwise suffer significant consequences, without being overwhelmed by those who can wait for treatment. The triage (or sorting) system is a tool that identifies patients that are high risk and need immediate resuscitation. Triage should be the first point of clinical contact and works best when it is a formalised process, such as that developed by the South African Triage Group.[23]

Screening systems should also be implemented for non urgent and chronic cases to receive more appropriate help. All hospitals have screening systems in place, but some of these systems are not very well-planned or managed. Some patients can be assessed and managed by a nursing staff rather than a doctor that eases the burden on the medical doctors. During the entry process, patients are given sufficient information to make informed decisions, particularly regarding costs. In South Africa, emergency centres are required to provide emergency and resuscitative care regardless of the financial status of the patient.

The hospitals' disaster plan must address staffing of the triage area, clinical evaluation and treatment areas, the admission or observation area and the resuscitation area. Applicable laws and regulations especially those of the Department of Health need to be incorporated into the planning. Reassignment of trained and experienced staff to other departments within the organisation can have a negative impact on the functioning of the emergency centre; however it may be necessary to ensure redirection of human resources because of fluctuations in the caseload in the emergency centre and acute needs in other departments. The staffing plan should therefore address the minimum level of emergency medicine/intensive care trained staffing acceptable in the emergency centre and contingency plans for use of staff from other departments in the event of high emergency caseloads.

Currently, there exists a triage system in just 40% of the regional hospitals which correlates with the walk through visits. Triage system needs to be instituted in 70% of the hospitals with separate red, green and yellow areas.

There may be a time when it is necessary to evacuate patients. The evacuation may arise from the already overloaded hospital from a mass stadium disaster into a situation where the hospital may experience an internal disaster simultaneously such as a fire. Evacuation can only be undertaken quickly and effectively if staff are trained in evacuation procedures. There are therefore written, updated plans, which should be regularly rehearsed and evaluated. All hospitals have complied with the rules of evacuation. While the overall plan is tested at least once a year, certain elements such as staff call out and equipment provision are not tested frequently.

Most hospitals (60%) have said that they already live on the edge of disaster everyday and have to make do with all the resources they have. However as much as there can be enough planning to avoid

such a disaster, should such a situation arise where all their resources would not be sufficient, they would have to outsource especially equipment and staff. Some hospitals (30%) had been affected by the previous tsunami crisis, and most hospitals (80%) were affected by the previous doctors' and nurses' strike. These adversities have now prepared the hospital to engage in action should another adversity occur. The hospitals were able to implement a strategy redirected resources from within non-emergency areas to those areas most urgent such as staff were transferred from the Psychiatry Unit to assist in Trauma and Casualty. The hospitals also sought assistance from private general practitioners for assistance in outpatient wards. This strategy can be adopted in the event of a mass disaster.

### **5.3 Section C-Emergency, Theatre and Isolation Areas**

In any working environment, providing optimal physical facilities ensure a pleasant environment, it reduces congestion, makes patient management more efficient and convenient and improves staff morale.[23] There should be a designated resuscitation area, which is equipped. A sufficient amount of space makes the working environment safe and protected such as in resuscitation, one deals with dangerous pieces of equipment, and a needle stick injury can be increased. The arrival of critical patients may be unpredictable, particularly in regions where patients use unofficial emergency transport, and there should be an alarm system, audible in the staff rest areas, to indicate the arrival of a critical patient.

Almost 55% of hospitals, especially the large and small district hospitals, have indicated insufficient working space. Although 90% have indicated the presence of a dedicated resuscitation area, they indicated a need for more room space, since at times the casualty areas overflow into the outpatient departments making it chaotic. It then results in the nursing staff of the outpatient unit becoming responsible for the casualty patient and impacts on their staff numbers and resources. There are also complaints of inadequate storage space to enable rapid retrieval and removal of equipment when needed.

Major and regional centres should be equipped with a decontamination area for the management of patients exposed to hazardous materials.[22] This Hazmat shower should be in close proximity to the ambulance entrance, should provide for patient privacy, should have a raised area to protect staff, should be spacious enough for patient and staff and should have good water run-off such that contaminated material can be collected and isolated. All hospitals in the study have a low pressure handheld shower that is suitable for the management of patients contaminated with hazardous materials.

However 55% of the larger regional and tertiary hospitals indicated a dedicated facility area or portable device for decontamination. 63% of the hospitals have just cold water supply to a

decontaminated area. A small proportion (27%) of the larger tertiary and regional hospitals has a water run-off from the decontamination area that is contained. The water from the decontaminated shower areas drain into a closed system or separate portable device, unlike the rest of the hospitals where the water drains directly into the sewage system.

There is only one hospital, the larger regional hospital that has a fully equipped isolation unit. The unit can accommodate outbreaks such as cholera, and international communicable diseases such as swine flu, avian flu and haemorrhagic fevers. However, the head of the unit has indicated that there is inadequate staff numbers and isolation technique training skills available.

#### **5.4 Section D- Drugs and Equipment**

Due to the severe budget constraints, it remains a difficulty to purchase drugs and equipment timeously and of the required amount. There is no buy-out system with regards to drugs and equipment. A buy-out system is purchase of goods from another provider such as the private healthcare. Although some disposable items such as gloves, needles and emergency drugs, can be purchased within the local tender at the hospitals bid-adjudication committee, some equipment can only be purchased at a central buying department. The hospital has to put a request for instance, an anaesthetic machine, to the central buying unit. The machine cannot be purchased immediately due to a standing policy that equipment over R100 000 needs to have approval obtained from the Provincial Department of Health and this can take up to as long as six months to purchase.

Policies and procedures guide provisioning management, and a competent and qualified person would ensure the effective provisioning of the emergency centre. This includes the prompt ordering of equipment and supplies, safe storage, prevention and notification of losses, effective distribution to departments on request, and maintenance of information relating to ordering, receipt, storage and distribution of equipment and supplies. Managers need to be assured that all equipment and supplies will be immediately available on request.

Currently, all the hospitals have stocks of emergency drugs as per standard guidelines. The problem arises when some drugs are not delivered on time to the stores. The hospitals have emergency equipment however attention needs to be given to sterile surgical sets and thermal control equipment which are found lacking in 30% of the hospitals, predominantly the smaller district hospitals.

Some of the hospitals report that they have equipment but it is old and outdated. Some use adult sets such as the laryngoscope, in paediatric patients due to the lack of the paediatric sets. Some pieces of equipment are faulty with mechanical errors but are still being used. Equipment can be rotated from departments in the event of a shortage, but should be used with caution, especially if improvising emergency equipment in the resuscitation of patients. Emergency equipment should be checked daily especially after each use, but 30% of hospitals lack in this protocol. The use of faulty equipment can

be very dangerous in the resuscitation of patients. It can cause complications such as foreign body aspiration.

In a walk through assessment of the drug refrigerator of a small district hospital, some drugs were expired in one of the smaller district hospitals. The refrigerator temperature as well was not optimum, and being raised, quite obviously would have led to the denaturing of the drug enzymes, rendering the drug unusable. In one of the smaller district hospitals, the refrigerator had food items stored along with the emergency drugs, and that is unacceptable. It can lead to contamination of the drugs and even the food itself can become toxic in the event of accidental spillage of the drugs.

Hospital Managers need to ensure that finances are made available for the purchase of those items of equipment and supplies, which have been identified as needed by clinical and managerial leaders. The provisioning managers therefore need to work closely with financial managers.

## **5.5 Section E- Human Resources**

### **5.5.1 Staff Employment, Recruitment and Skills Training**

In South Africa alone, the country continues to experience a loss of highly skilled health professionals (doctors, nurses, dentists and pharmacists) to Australia, North America and Europe. Some of the pull factors include: information, communication and technology making it easy to access information on jobs, visa applications and process; availability of employment opportunities; better remunerations and working conditions; secure and conducive living conditions; and opportunities for intellectual growth, e.g. further diploma and degree courses. The push and pull factors have led to brain drain of health professionals from African countries. This has exacerbated the already weak national and district health systems, making it extremely difficult for countries to achieve the United Nations Millennium Development Goals.

Patient care is usually compromised during this significant brain drain and is best provided in settings where there are sufficient numbers of staff and where staff turnover is low. The eThekweni District not only has to deal with the significant brain drain, but also with the upcoming 2010 FIFA World Cup Soccer and needs to provide a healthcare enabled to treat that of a world class international event where thousands of people will be streaming into its city.

A streamlined process is then required to ensure that available posts are filled especially six months before the mass event. It would be undertaken to ensure that new staff are well oriented to the hospital and its system. When financial incentives are insufficient to encourage staff retention, educational opportunities and support systems for staff confronted with significant ethical or personal problems will reduce attrition. . Contract workers and volunteers must also be oriented to the organisation and their specific assignment or responsibilities. This is particularly important for agency nursing and

medical staff and staff offering sessional services and to ensure that there is no chaos during a disaster.

Currently, 80% of the hospitals have a 24 hour emergency team of doctors and nursing staff. The problems experienced though are that the staff numbers are quite low for an international event. One of the larger regional hospitals has an anaesthetic vacancy rate of 70%. The smaller district hospitals function on a nights shift at times with no senior professional nurse on duty at casualty. Most of the casualty or trauma teams comprise of interns, community service officers and medical officers. One of the district hospitals has two interns and a medical officer on call each day. The problem arises when there are two emergencies simultaneously and the medical officer can only be present at one of the cases.

There are registrars who rotate through the various emergency units are not permanent staff since they rotate through many hospitals. Some of the registrars are senior registrars completing their final year of training and will leave the public healthcare system. In situations where the emergency centre doctor does not possess appropriate advanced life support qualifications, these must be provided by another doctor, who may be on site from another department. Supervision needs to include case discussions, rounds if there are admission facilities, and a system for telephonic consultation with more senior colleagues after hours.

Apart from the staff numbers, staff training is an imperative part of an emergency unit. The FIFA has recommended the MIMMS and HMIMMS courses to be undertaken, apart from the doctors having training in ATLS, ACLS, APLS and nursing staff with basic trauma skills. The process for and the frequency of the ongoing evaluation of staff abilities should be defined. Ongoing evaluation ensures that training occurs when needed and that the staff member is able to assume new or changed responsibilities. There should be at least one documented evaluation each year for each staff member. However the current Performance Management Evaluation does not make provision for training certificates to be reviewed.

The hospitals have scored very low in some areas of skills training such as 27% in MIMMS. Two of the regional hospitals have yet to undertake the MIMMS training offered. The district hospitals may eventually be used as either a step-up care or a step-down care facility. In the event of the hospital being used as a step-up care facility, the staff was not afforded the opportunity to undertake the disaster management courses that had been offered only to the regional hospitals. The two larger tertiary and regional hospitals are the only hospitals with an emergency medicine specialist and head of unit. An average of 64% of the hospitals have doctors with ATLS and APLS training, whilst 55% have ACLS training and 45% HMIMMS. There is a clear need for more skills training especially in terms of MIMMS, HMIMMS and ACLS. In terms of ACLS, APLS, ATLS the doctors need to renew

their certificate every two years however 30% of doctors indicated their certificates were expired, and were not counted in the skills training.

In terms of training, all clinical staff must have at least current CPR training. All clinical staff working with children must have at least a current paediatric CPR training. New employees should be provided with CPR training within one month of appointment. The departments need to show evidence that all staff are updated at least annually on resuscitation matters and that resuscitation teaching staff, attend courses and seminars on resuscitation to ensure current competence.

Clinical managers therefore need to ensure that training and education needs for clinical issues are identified, that appropriate training and education is provided, and that staff show proof of competence.[22] Staff must also trained in health and safety matters, infection control; and new equipment and procedures. There should be documented evidence that each staff member who has attended training has gained the required competencies.[23] The hospital and medical managers need to support ongoing staff in-service education by making available space, equipment and time for education and training programmes.

### **5.5.2 Waste Disposal, Water and Sanitation**

Inappropriate disposal of hospital waste constitutes an environmental hazard and housekeepers and healthcare professionals play an important role in controlling this. Colour coded systems are available in all the hospitals to ensure that waste is appropriately dealt with. Information on the appropriate use of these systems must be made available to all staff. Although there are containers for needles and sharp instruments, hospital staff still report that needles are at times found in the bed linen in the laundry room. There are also bins with different colour liners for normal waste and hazardous waste such as blood stained gauze, however on walkthrough at some of the hospitals, it is noticed that waste is being disposed of in incorrect bins. The staff are discarding normal waste such as coke cans into the hazardous waste bins.

Water quality can change suddenly due to many causes, some of which can be outside the organisation, such as a break in the supply line to, or contamination of the water source.[22] Plans should exist to guide staff in the use and conservation of water if an emergency water source is used. Although 72% of the hospitals have storage water in tanks, the water is not tested regularly to ensure the safety as drinking water. As mentioned in the results section, some of the tanks have the presence of fungus on the filters along with a dead rat in one of the smaller district hospital tanks. It is harmful and can lead to water-borne infectious diseases. An increased monitoring and testing of the water is important on the hospitals functioning to avoid the spread of disease and especially during bioterrorism or a cholera outbreak.

The safety and hygienic conditions of a hospital with regards to water and sanitation is absolutely imperative. None of the hospitals have portable toilets which is important in the event of a mass disaster, and the setting up of camps at the various sites. Some of the hospitals have indicated that they would outsource the toilets, but whether it will be via a central district or provincial buyout is not yet known. One of the state-aided hospitals has indicated that they have a database of numbers for portable toilets and portable decontamination units.

### **5.5.3 Electricity and Maintenance**

Utility systems (electrical, water, oxygen, ventilation, vacuum and other utility systems) should be maintained regularly to minimise the risks of operating failures. Gas cylinders and medical regulators need to be checked weekly, especially in units of casualty, trauma and theatres. Records of tests and vacuum supplies need to be available; however the smaller district hospitals lack this record keeping information. Most hospitals, about 70%, have noted a system for the provision of emergency technical backup 24 hours a day seven days a week.

Scheduled tests of the back-up generators need to be undertaken regularly. Back up fuel needs to be available for diesel powered generators.[22] All hospitals have their critical points identified, listed and provided with emergency power. However services to be made available in the event of a power or water failure still needs to be defined by 50% of the hospitals. In addition the hospitals need to ensure availability of plug points for telephones, computers and emergency equipment.

### **5.5.4 Occupational Health and Safety**

Fire safety protocol and procedures of the hospitals form part of the integral plan in the disaster plan.[22] Hazardous materials, its handling and storage of flammable and other materials are hazardous to employers and patients and needs to be highlighted. Staff should be educated on how to reduce risks, and how to monitor and report situations that pose risk. All hospitals have an occupational health and safety programme. The larger tertiary, regional and district hospitals have an occupational health and safety committee with a documented health and safety programme. The smaller district hospitals have a health and safety representative to ensure the implementation of its programmes, although there is no formal committee.

All hospitals have access entrance points with a sign posted. However some hospitals lack ample parking space, especially the hospitals in the central city. Each hospital has an adequate pick-up and drop-off areas for the patients. A wheelchair access by ramp is important and about 60% of hospitals did include this. Another important aspect is the undercover parking for ambulance and emergency vehicles, and its close proximity to the emergency doors. The hospitals do have emergency exits, fire escapes, fire extinguishers and hoses.

The hospital employers have reported that there are insufficient resources in terms of gloves, masks, eye protection, gowns, aprons and shoe covers especially in theatres. Policies are present at each hospital for the control and disposal of sharps, including the nature and location of sharps disposal containers. There are mechanisms to ensure the provision of occupational post-exposure measures for blood and other potentially infectious material in keeping with provincial and national guidelines. There are antiretroviral agents for HIV prophylaxis available to all staff within 15 minutes in the event of an accidental exposure however there is a clear need to order excess packs in readiness for the 2010 event.

### **5.5.5 Community Participation and Volunteers**

The role of volunteers and community participation is imperative in the management of disaster. Their active participation should be encouraged as they could be useful in many ways.[22] In the plight of staff shortage, the community such as the social woman's circle, can serve to assist in cooking, cleaning, feeding and bedside care of the incapacitated patient and there also exists a pool of veteran doctors and nursing staff that would be useful to even deploy to the community health centers, freeing those doctors to work at the main disaster management hospital.

Although international aid is available, community support is a quicker, cheaper and more effective solution in the long term.[22] A total of 63% of the hospitals have an affiliation to community participatory groups. Volunteers also hold a huge importance since they can be prepared and passive skills training passed onto them, which proves useful during times of disaster. Some volunteers can even help with the translation of language enabling easy collateral information to be obtained by the healthcare staff. The majority of hospitals (80%) indicated the access to volunteers in times of emergency. These volunteers are predominantly from private non-governmental organizations and religious groups.

The value of wider public participation and efforts that span public and private interests has largely increased during recent years. It has led to some innovative partnerships and other efforts to strengthen relationships among academic and technical expertise. Efforts are required to strengthen the mutually supporting roles envisaged at national, provincial, district and municipal levels of activity. Wider opportunities for engagement and more support to non-governmental organizations, community based organizations and the promotion of volunteerism, remain to be addressed more effectively to enhance and sustain local community capabilities.

In terms of Batho Pele principles of access to information, there needs to be easily understandable information on disaster risks made available to all hospitals and communities. The information should take into account cultural and social factors in terms of promoting health awareness at fan parks as well. One can promote road safety by not drinking and driving and in particular apart from a

mass scale disaster, other issues like safe condom practices that can lessen the impact on the prophylactic treatment, making it more available for needlestick injuries.

National, Provincial and Local Government have a crucial role to play in influencing public opinion and health promotion. Much more can be done to increase awareness through schools, local organizations and community networks that unite members according to common interests. The media remain greatly underutilized as a resource for mounting more effective public awareness and advocacy campaigns about risk-related issues.

## **5.6 Limitations of the Study**

The study has various limitations predominantly due to service delivery and limited resources.

### **5.6.1 Excluded Hospitals**

In the selection of hospitals, all private hospitals were excluded from this study. The community healthcare centres and primary health care institutions in the eThekweni District have not been included in the study. The study does not consider the private sector hospitals along with their facilities, services delivered and healthcare professional staff that are available.

It would have been important to have included the private healthcare sector, as there is an already huge overload impacting on the resources of the public healthcare sector. There needs to exist a private-public partnership to ensure a safe and effective running of the 2010 FIFA World Cup Soccer event. Community and primary healthcare centres can serve to become a step-down care in times of crises. In addition, some skilled doctors and nurses maybe working in these institutions and they may already have the necessary training skills in terms of emergency management in a mass disaster. The numbers of staff at these excluded institutions, if known, could also help aid the hospitals in the event of such a situation calling for an increased number of doctors.

### **5.6.2 Emergency Services**

The study does not consider fully the operational services and facilities of support services such as Emergency Medical Response Services in terms of how many response vehicles and units, including paramedics and call centre consultants that are currently available. It also does not allow for a projection of the numbers of response teams and vehicles that would be needed. The numbers of hospital vehicles that usually aid in transportation of patients have not been included in the study. Private emergency medical response units and team numbers have also not been included in the study.

### **5.6.3 Support Services**

The number of crisis centres treating rape, violence, and alcoholic and drug abuse, along with their staff numbers has not been included. Professional staff such as psychologists, trauma counsellors and social workers have not been included both from the private and public healthcare sector. Other

support services such as physiotherapy and occupational therapy have not been included in this study. The staff numbers and services and facilities for the support services are not included for both the private and the public healthcare sector.

The study although it investigated the availability of the radiological services, has not accounted for several other variables. Where specialist resources are limited, non-radiologists may be expected to conduct contrast studies. In this situation, the onus lies with the organisation to provide training for these individuals. Several criteria were not focused on in the study such as whether the organisation has established expected waiting times for radiological studies according to triage status and if actual waiting times have been audited. Excluded from the study were variables such as the verification of certificates to prove that the hospitals satisfy the statutory requirements under the ionising radiation regulations.[23]

Pharmacies from both the private and public healthcare sectors have not been included in the study. The numbers of pharmacists and assistant pharmacists are not included. The emergency drug supply and consumables provided by these services have not been taken into account, nor have their projected needs been taken into account in the event of a mass disaster. The stores' supplies of both the hospitals and at provincial level have not been considered. Consumables such as plaster of paris, splints, bandages, detergents for cleaning and infection control, antiseptic agents,

#### **5.6.4 Laboratory Services**

The National Health Laboratory Services and the Blood Bank services, along with private laboratories have also not been included in the study, since it is an entire comprehensive study on its own. One would have needed to acquire the number of staff available, the numbers of blood, plasma and colloidal units available and other such variables like equipment for blood and cross matching along with equipment and consumables for other blood tests necessary in an emergency. Banked emergency blood is subject to stock control and should be replaced before the expiry date.

Bedside tests are performed within the emergency centre by non-laboratory staff and give rapid results.[23] They are particularly important where laboratory facilities are not available on the premises; transport time to external facilities can be a major factor delaying appropriate treatment or discharge from the emergency unit. The study does not take these factors into account.

Determination of blood glucose, either finger-prick haemoglobin or haematocrit testing; and urine testing are considered essential for an emergency centre. Some of these tests are sent to private laboratories, if no mini-lab equipment on site. Most hospitals have indicated the affiliation to the NHLS, but one of the state-aided hospitals sends its specimens to a private laboratory. These private laboratories have not been considered in the study as well.

Centres in areas where malaria is endemic, or where tourists are frequently seen, should also have rapid, antigen based tests for the diagnosis of *Falciparum* malaria.[23] The study does not take into whether kits for the detection of communicable and vector-borne diseases, are available at the hospitals or laboratory.

Blood gas analysis is particularly useful; not only does it give data concerning ventilation and gas exchange, but also acid base balance and electrolytes. Lactate measurement gives useful information and is a calibration, which can be added to most blood gas machines. Training and quality control are required for all point of these care tests.[23] The study does not include the training or quality assurance of these emergency tests.

### **5.6.5 Mortuary Services**

Each hospital has access to a mortuary within the district. Although 91% of hospitals have a morgue on site, the morgue staff number and the slate number have not been accounted for in the study. The small district hospitals have to wait for hours to have a body removed from the premises. The central state-aided hospital has a contract with a private mortuary service. The private mortuary services, forensic laboratories and forensic pathology staff have not been considered in the study. It is imperative though that a system be implemented for the identification of bodies especially during a mass casualty onset. The bodies need to be tagged appropriately for identification at a later stage along with the safe keeping of the medical records.

### **5.6.6 Housekeeping, Laundry, Catering Services**

Although overlooked at times, housekeeping is imperative during emergency crises. The study does not take into account the number of general orderlies or porters. There should however be an adequate number of trained staff to ensure the cleanliness of the emergency unit and hospital. There should be policies and procedures available relating to the appropriate cleaning methods and materials for various surfaces. Clinical areas need to be kept in a clean and hygienic condition and should be monitored. Certain areas need high sterility and the employers need to be trained in this regard.

There is a sluice room in each department of the hospitals. The state of hygiene and equipment numbers was not considered in the study. It should be kept hygienically clean at all times and is not used of any other purpose than storage and cleaning of bed pans, urinals and depositing of soiled linen, dressings and other waste. The hospitals have a linen room with adequate ventilation, which is used only for the storage of clean linen but this was not investigated further. There are cleaner's rooms with adequate ventilation for the storage of cleaning equipment, mops and brooms. The cleaners should be aware of the different colour coded mops for use in different low and high risk areas.

In times of disaster, more patients means more visitors and this will impact on the catering services. The numbers of staff, the food supplies and utensils and crockery need to be determined and planned by the individual hospitals. All laundry, cleaning services and catering services can be outsourced in times of crisis, but a verifiable listed database should be present at each hospital. The larger tertiary hospital has its cleaning and catering services outsourced, and parts of the laundry service are also outsourced.

### **5.6.7 Security**

The hospital has a responsibility to ensure that staff, patients and visitors are safe from attacks or theft. The body with responsibility for health and safety identifies areas of high risk, which may require extra security precautions. Although the study proves that all hospitals have an entrance door that is manned 24 hours a day, it does not account for the security planning, numbers and whether the security staff is outsourced or not. Plans to provide protection in these areas and situations need to be developed and implemented in those hospitals lacking security. The loss of organisation property must be prevented as far as possible through the implementation of security systems during any mass disaster, which can become overwhelming for the security staff.

Security officers need to be aware of their powers and duties relating to the restriction of access to the premises, the apprehension of intruders and their important role during a mass disaster.[23] The head of security needs to be involved in all executive management meetings and should appoint a designated person to collaborate with emergency care centres.

There should be a mechanism of summoning immediate security assistance, including the army, during a mass disaster. The hospital needs to ensure that their security staffs are easily identifiable and that their duties need to be clearly defined in the event of disaster. Safety and security systems must also be developed with the input of staff.

Controlling visitors' access to the centre is important, not only as a security precaution, but because anxious relatives in clinical areas can impede delivery of services especially in huge patient numbers. Additionally, community emergencies, VIP admissions and other newsworthy events may lead to invasion by the media during this world class event. Policies should be available to guide all staff, but clerical and security staffs are particularly important in implementing visitors' control.

### **5.6.8 Economic Costing**

The study does not investigate the economical impact of the 2010 FIFA World Cup Soccer on the eThekweni Hospitals. It does not address the costs that would incur in the event of upgrading facilities and services at the hospitals. The current financial budgets of the hospitals are not included in the study. A separate costing study would be needed that should include all the limitations that were not

accounted for in the study. Health economics is an important factor in terms of the District's micro- and macro-financing of resources.

#### **5.6.9 Qualitative Perceptions**

Questionnaires may not be answered accurately, since participants' perceptions, attitudes and beliefs may affect the response. Some participants may believe that this is an assessment of their hospital against other hospitals and may withhold important information in the study. Some sections of the questionnaires may be filled in by employees that are not aware of the entire services, facilities and equipment available at the hospital.

## **Chapter 6: Recommendations**

### **6.1 Section A- Disaster Plans, Policies and Communication**

#### **6.1.1 Establish a Central Disaster Management Centre**

Risk assessment, disaster prevention and preparedness, the capacity to prevent, reduce and mitigate disasters and the early warnings are key to effectively manage and contain a disaster.[22] An establishment of a functional disaster management centre is imperative. The establishment would address the disaster relief, the rehabilitation and reconstruction of the impacted area and should serve to monitor and evaluate all disaster management programmes from a central unit, thus standardising management across the province. This is recommended in light of each hospital not having sufficient skilled staff trained in disaster management. This could alleviate such a problem and also standardise the management of both internal and external hospital disasters.

#### **6.1.2 Establish a Central Bed Bureau**

A central area of communication which needs continuous information being fed into that system, timeously, needs to be commissioned. This would be important because it assesses the bed status on a daily basis in terms of admissions and discharges. This area/unit needs to receive information that can be validated by that institution via a person delegated in a position of authority with a background clinical knowledge and an understanding of hospital management.

Requirements of a bed bureau:

1. A standardized system of reporting;
2. An appropriate communications system i.e. a hospital informatics system that can provide with a real-time bed status and being able to cope with the dynamic changes thereof;
3. A development of a step-down facility is mandatory where current bed shortages exceed bed occupancy by patients requiring a lower level of care, who usually block acute/higher level care beds and;
4. There still exists a social issue around transport i.e. physical discharge vs. clinical discharge which needs to be addressed. Patients that have been discharged still stay on further as some are homeless, thus occupying a bed meant for an acutely ill patient.

#### **6.1.3 Governance: Organizational, Legal and Policy Frameworks**

There should be an intercollaborative partnership for international assistance.[22]. There should be a forged partnership between the FIFA Organization and South Africa, where FIFA must assist the country, especially as a developing country, in the aide of resources. In addition, other international

sporting, healthcare, and disaster organizations such as the World Health Organization and International Disaster Reduction Organization need to assist the country in its skills training and provision of resources.

There needs to be an established disaster reduction strategy that must be linked to individual sectoral interests. It has to also integrate into the national and local development planning and objects that is unique to that district. There is also a need to strengthen national platforms for disaster reduction. It should be an intercollaborative partnership to make progress in addition to the recognition of political will and practical action that is required to support disaster risk reduction.[22]

One needs to ensure that all roles, responsibilities, opportunities and resources for the development of risk reduction strategies are based on partnerships. It must also be grounded in the local community interests and encourage wide public participation. In the situation of an international event such as the 2010 FIFA World Cup Soccer, the national and provincial government, along with the eThekweni District needs to allocate resources from emergency and development budgets, both at a regional and national level, to enhance disaster risk reduction strategies. There must be weekly meetings to monitor the progress of the implementation of disaster plans.

The policy frameworks need to be modified and updated with a more comprehensive and strategic approach to disaster reduction. There has to be a flexible policy framework that allows for a variety of implementation approaches. The creation of continuing supports for national committees, provincial and district committees, multidisciplinary, multisectoral and multi-stakeholder platforms for disaster reduction must be widely advocated.

## **6.2 Section B - Medical Services and Emergency Facilities**

There has to be standards established for systematic collection and archiving of comprehensive national, provincial and district statistical records pertaining to all disasters experienced and the various related aspects of disaster risk reduction. Those hospitals for instance, near the beaches that experienced the tsunami crisis and those that were impacted by the doctors and nursing strikes, need to draw back on the management, and archive the implementation of their disaster risk management. There is an increasing recognition of the need for continuous updating of data and related analytical tools to form a shared resource basin. Even here, hospitals need to have a well equipped hospital informatics system that can ultimately someday, be linked to a central office which can view the bed status, staff numbers and patient discharges and deaths.

- There has to be an early warning system that is centered on people at risk and which integrates the essential dimensions of risk assessment, warning generation, dissemination, preparedness and response capabilities.[22] Early warning should be implemented as an essential element of national development policies and plans. A good communication and

enhanced data call base can speed up an early warning system to the hospitals and community at large. Early warning systems and surveillance is imperative for identifying infectious diseases and outbreak of an epidemic at the early stages. In keeping with International Health regulations, the district must ensure maximum security against international spread of disease with minimum interference with world traffic. Health administrations are required to notify WHO of outbreaks of diseases immediately and to provide epidemiological information as soon as possible. Government may obtain WHO's immediate assistance in the investigation and control of epidemics. Thus surveillance would be a useful tool in monitoring and evaluation of infectious diseases and outbreaks of threatening epidemics.

The hospital should have a colored guiding system with respective floor-marking that can assist to avoid disorder. Since all medical measures have to begin at the emergency entrance, it is at times forgotten or neglected in the hospital disaster plan. Sorting out the most priority patients as per medical care resuscitation survival needs is important. Having a screening sister at the emergency entrance is imperative to prioritize emergency patients and direct patients to the correct designated emergency areas. Increased admission of patients requires increased suitable areas such as room for the injured and the relatives.

Triage Plans need to be instituted at 70% hospitals.

The emergency plan needs to include:

- Planning by the organization to deal with overwhelming numbers of patients;
- Alternative sources of medical supplies, communication equipment, and other materials;
- A plan to deal with disruption of water and/or electricity supplies and;
- Processes for alternative care sites when the organization is directly affected by community emergencies.

The necessary departments such as radiology, anesthetics, blood bank, the laboratories, and pharmacies have to prepare for more extensive performances. Technical systems such as communication systems, power plant and medical gas supply may fail due to overcharge. Counter-measures have to be effective.

### **6.3 Section C- Emergency Theatre and Isolation Areas**

In order to reduce the underlying risk factors, there has to be a strengthening of the private and public healthcare sector partnerships, the scientific and academic abilities, and the encouragement of wider knowledge exchange and technology transfer between districts and provinces.[22] It is important since the private healthcare has a vast pool of resources, both in term of skilled staff and equipment. In times of disaster, private general practitioners, nursing staff and surgeons can be recruited to assist

with the public hospitals. It is further important in terms of bed shortages, if critically ill patients need to be transferred from a public to private hospital. The District needs to strengthen the capacity of the hospitals by revitalization, implementing mitigation measures to reinforce existing facilities such as the intensive and cardiac care units and theatres.

It needs to identify and allocate or redirect resources from the district and the hospitals development and emergency budget for disaster and risk management, to greater effect in the realization of sustained risk reduction. The District needs to mobilize and redirect its resources towards areas where gaps have been identified, especially training skills, isolation units and intensive care units.

Thus more pressing needs would include education and training, and more detailed planning that acknowledges the specific disaster medical needs of hospitals and Intensive Care Units. In addition, more posts need to become available for trauma and casualty specialists, medical officers and nursing staff. The District Office needs to monitor the skills training of the staff in terms of the numbers and the workshops attended.

The use of advanced technologies and shared datasets is important in the reduction of underlying risks.[22] A shared dataset will allow all hospitals to see the current status of other hospitals in terms of bed occupancy rate, theatre slates, ICU availability and the numbers of healthcare professionals present. This dataset will help in the sharing of resources should the need arise. The healthcare information system and the hospitals' information system need to be strengthened and updated. The idea would be toward all hospitals having an electronic data system which should eventually feed into a central unit such as a bed bureau. It would be then be possible to note at a glance the number of beds, doctors, nursing staff and patients that are available at that point in time. It would also make for research to become easier and user friendly since the district health information would be readily available for all the public healthcare sector hospitals.

#### **6.4 Section D- Drugs and Equipment**

There has to be an increase in resources to emergency equipment. New equipment needs to be purchased and faulty equipment repaired. Drugs and equipment need to be ordered six months before the 2010 FIFA World Cup Soccer. Resource limitations can be seen as impediments to initiating a long-term disaster reduction programme. Increased resources should be allocated specifically from development budgets to realize risk-reduction objectives either at national or through international financial mechanisms. Initiatives that encourage the explicit commitment of development funds for disaster risk management need to be supported as a matter of principal and priority. There must be a system in place to monitor and audit the drug usage and availability to ensure no drug stock-outs closer to the event.

## **6.5 Section E-Human Resources**

### **6.5.1 Health Promotion, Information Exchange and Public Awareness**

Disasters can be substantially reduced if people are well informed and a culture of disaster prevention is instilled.[22] There needs to be a collection, compilation and dissemination of relevant knowledge and information on the hazardous vulnerabilities and capacities. Toilets need to be stocked with condoms in keeping with the HIV Campaigns. From a point of staff protection, vaccines such as the H1N1 need to be available to all emergency staff.

Health promotion should be implemented at schools and universities in developing programmes and activities on how to minimize the effects of a disaster. Volunteers can also be trained in this way and this involves active community participation as well.

### **6.5.2 Staff Recruitment, Retention and Skills Training**

One of the key components of an effective health and medical care response is ensuring adequate supplies of a broad array of qualified health care providers. In the planning of a risk reduction, key role-players are the public health specialists, emergency and trauma specialists, occupational health and safety specialists and clinical specialists. In the actual site management of the disaster, important life skills training needs to be provided to staff to equip them with the necessary training to save lives. Even if there is a low budget, training cannot be compromised. Staff should also be trained in multitasking. There needs to be disaster drills weekly to monitor, assess and prepare the staff in their readiness.

Certain competencies are common for all trained personnel, regardless of the type of emergency encountered. All hospital staff should be oriented and educated annually in the emergency management plan, its command structure and how it is integrated into a community-wide response. Employees should be assigned roles and responsibilities and should have sufficient training to demonstrate competencies in the following areas:

- Knowledge of the hospital's command structure and community interface;
- Knowledge of the general roles and responsibilities;
- Knowledge of the back-up communication system ;
- Knowledge of the onset of an emergency and activating the emergency response;
- Knowledge of the hospital's emergency color coding system;
- Knowledge of the hospitals policies and procedures utilized for emergency operations;

- Knowledge of infection control practices;
- Knowledge of hazard communications.[23]

Training should not only be confined to a general disaster response, but also to a legal and ethical basis for allocating resources. The training apart from basic and advanced life skills needs to incorporate; how to recognize the signs and symptoms of specific hazards and treat specific conditions, decontamination and isolation protocols, triage protocols, personal protection gears and the use of all emergency equipment.

There needs to be further strategic planning to increase and fill vacant posts of emergency medicine practitioners, anesthetists, trauma surgeons, emergency nursing professionals and public health practitioners. Furthermore, strengthening of the hospitals' policy in terms of retention of staff can be undertaken by improved working conditions and other ethical incentives.

Other protective measures important to the hospital are its security which needs to be highly operational at the outset. Security should strive to secure the driveways for emergency vehicles and they must restrict and control the entry to the hospital. They should also assist in the direction of authorized persons into their designated areas namely visitors into visiting areas. They also need to protect personnel and patients within the hospital.

### **6.5.3 Research**

There needs to be an increase in the research of disaster management and risk reduction. There are very little retrospective literature studies on disasters and disaster management in eThekweni District. The District needs to develop improved methods for predictive multi-risk assessments and socio-economic cost-benefit analysis of risk reduction actions at all levels. In addition, they must further incorporate these methods into decision-making processes at all levels of government.

There needs to be a strengthened technical and scientific capacity to develop and apply methodologies, studies and models to assess vulnerabilities in terms of mass disaster events. The media should promote a culture of disaster resilience and strong community involvement at all levels of society.

## 7. Conclusion

The key for any successful mastering of a crisis is to be well prepared. The public health approach in disaster management is thus imperative as it focuses on the preventative aspects, rather than a full curative plan of action. The approach would be applicable and generalised to other provinces and possibly other developing countries that are already resource constrained. Some investments may be expensive but are most likely well worth it. Resources need to be redirected or repurposed to ensure effective and efficient service delivery. Decentralisation of funding and resources is imperative in this regard.

The study highlights many deficiencies within the eThekweni healthcare district. Although disaster plans and policies are present, it does not include a strong clinical and corporate governance programme. Communication in the form of transport, hospital informatics systems and tele-communication still needs addressing. The hospitals do offer the packages of care and services but are severely compromised by decreased skilled staffing and lack of drugs and emergency equipment. Attention is drawn to the few emergency units and ICU areas that are imperative for infectious disease control as well.

The study has also included many principals of public health that are important in the strengthening of disaster management. To begin with, having a well integrated health policy framework for planning and programming at all levels are imperative in the preparedness and vulnerability reduction of disasters. The systematic implementation of emergency preparedness, response and recovery programmes can then be implemented at the hospitals within the framework.

Integrated corporate governance planning helps develop and strengthen the district and its hospitals. It is important to have strengthened Private-Public Partnerships. An intercollaborative sectoral partnership must be created with all stakeholders such as non-governmental organisations, national and international aid.[22]

In a developing country that is resource constrained, the impact of the 'brain-drain' has further led to a loss of our emergency health care professionals, being poached as well by other countries. The concepts of multitasking and community participation are very helpful and useful in filling the gaps, especially in times of disaster.

There needs to be advancement in the area of telecommunications, telemedicine and hospital informatics. It will help in pre-planning of disasters and can reduce the cost of the impact of a disaster considerably especially in terms of time and resources.

Health promotion programmes and the education of hospital staff and the community play a vital role in minimizing disaster costs and promoting a safe environment.

The objectives and recommendations need to be taken into account and its realisation of the outcome will require a full commitment and involvement of all stakeholders including government, national and international organisations, the private sector, the scientific community and the local community at large. It is fundamental in contributing toward the successful hosting of this tournament by the eThekweni District, ensuring that the public health safety measures met are of the highest international standards.

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## Chapter 9: Addenda

### Appendix A-Letter of Approval Department of Health

Authorization from Department of Health-eThekweni District Office



**eTHEKWINI DISTRICT OFFICE**  
 Private Bag X 54318, Durban, 4000  
 83 Jan Smuts Highway, Mayville, 4000  
 Tel.: 031- 2405427, Fax.: 031- 2405600  
 Email.: chauntelle.bagwandeem@kznhealth.gov.za  
 www.kznhealth.gov.za

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Reference	cb/1505/08
Enquiries	Dr C.I. Bagwandeem
Telephone	031-2405427

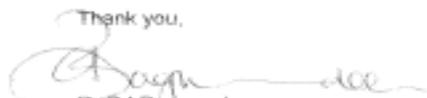
21 July 2008

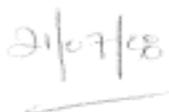
To Whom it May Concern

**PERMISSION TO CONDUCT STUDY**

This is to confirm that Dr N Singh was requested by the Management of eThekweni District Office to conduct a study regarding the levels of Hospital Preparedness to manage a Mass Disaster during the Soccer World Cup 2010.

Thank you,

  
 Dr C I Bagwandeem  
 Principal Specialist  
 eTHEKWINI DISTRICT OFFICE

  
 \_\_\_\_\_

## Appendix B - Research Questionnaire

Name of Hospital :

Participants Designation:

Date :

N = No      Y = Yes      No. = Number

KEY AREA	QUESTIONS-CURRENT AVAILABILITY	Y/N	No.	Perceived Minimum Requirements
<b>SECTION A – DISASTER PLANS, POLICIES AND COMMUNICATION</b>				
1. Disaster Plan	In hospital disaster plan including documentation  Disaster plan practice  Hospital has a disaster coordinator			
2. Alerting System	Does the plan specify how notification within the hospital will be carried out?  Does the plan detail responsibility to initiate a system for recalling staff back on duty?			
3. Response	Has the hospital developed internal disaster plans for internal emergencies?  Has the hospital developed plans indicating how it will be able to supply resources and personnel in response to an external disaster?  Is there a separate entry to the Emergency Centre for contaminated patients?  Is there a dedicated facility, area, or portable device for decontamination?  Is there hot and cold water supply to the decontaminated area?			

	Can water run-off from the decontamination area to be contained?			
4. Clinical Governance	Hospital has a clinical governance programme			
5. Communication	Base-station radio-link with EMRS / VOC			
6. Aeromedicine	Helipad / landing zone  Closest airport			
<b>SECTION B – MEDICAL SERVICES AND EMERGENCY FACILITIES</b>				
7. Emergency Entrance Gate	Entrance door manned 24/7  Illuminated and clear signage at entrance to emergency centre			
8. Triage System	SATS (SA Trauma Score); TEWS (Trauma Early Warning Score) or equivalent  Trolley / Wheelchair Parking  No. of trolleys			
9. Medical Services	The following are available 24 hours/day <ul style="list-style-type: none"> <li>• Emergency Medicine</li> <li>• General Surgery</li> <li>• Anaesthesia</li> <li>• Trauma Surgery</li> <li>• Orthopaedic Surgery</li> <li>• Intensive Care</li> <li>• Internal Medicine</li> <li>• Obstetrics/Gynaecology</li> <li>• Paediatric Surgery</li> <li>• Paediatrics</li> <li>• Radiology</li> <li>• Psychosocial support services / councillor</li> </ul>			

10. Radiology	X-Ray service on site 24/7  CT Scanner 24/7  Ultrasound 24/7			
SECTION C – EMERGENCY, THEATRE AND ISLOLATION AREAS				
11. General Treatment Area	Sufficient space for staff, equipment, activity:  Emergency power provided for all essential equipment and lighting			
12. Observation Ward	Observation beds in gender-defined wards of good functional condition available (no. of beds)			
13. Resuscitation Area	Dedicated separate area  No. of Resuscitation beds  Emergency power provided for all essential equipment and lighting			
14. Operating Theatres	24/7 facilities for major trauma  Thermal control equipment  a. For patient-patient warming blanket b. For blood and fluids-high capacity For blood and fluids-fluid warming			
15. Critical Care	ICU/high care unit with ventilation facilities  No. of beds			
16. Isolation Unit	Isolation facility on site or sister-hospital?  Would the isolation facilities accommodate outbreaks such as cholera, and international communicable diseases such as swine flu, avian flu and haemorrhagic fevers?			
17. Emergency Unit	Emergency Medicine Specialist			

SECTION D – DRUGS AND EQUIPMENT				
18. Drug List	Emergency Drug List as per standard guidelines			
19. Equipment	The following equipment is available in resuscitation:			
	Laryngoscopes			
	Endotracheal Tubes of all sizes			
	Bag-Mask resuscitator			
	Pocket masks			
	Oxygen			
	Pulse oximetry			
	End-tidal CO2 determination			
	Suction devices (portable/fixed)			
	Electrocardiograph			
	Defibrillator			
	Standard IV fluids and administration devices			
	Apparatus to establish central venous catheter venous pressure monitoring			
	Sterile surgical sets for <ol style="list-style-type: none"> <li>a. Cricothyrotomy</li> <li>b. Thoracotomy</li> <li>c. Vascular access (cutdown)</li> <li>d. Chest decompression</li> <li>e. Suturing</li> </ol>			
	Skeletal traction devices, capability for traction			
	Thermal control equipment <ol style="list-style-type: none"> <li>a. For patient-patient warming</li> <li>b. For blood and fluids-high capacity</li> </ol>			

	c. For blood and fluids-fluid warming			
SECTION E – HUMAN RESOURCES				
20. Staff	Adequate 24/7 doctor coverage  Dedicated emergency unit nursing  Number of doctors  Number of professional nurses			
21. Doctors Training Skills	ATLS ( Advanced Trauma Life Support)  ACLS (Advanced Cardiac Life Support)  APLS (Advanced Paediatric Life Support)  HIMMS (Hospital Major Incident Management)  MIMMS (Major Incident Management System)			
22. Nursing Training Skills	ATLS  Basic Trauma Skills (in house)  Isolation procedures			
23. Volunteers	Does the hospital have access to or made provisions for volunteers/ volunteer groups?			
24. Community participation	Is the hospital affiliated to any community based participatory groups that could support in a disaster?			
25. Translators	Do you have access to translators?			
26. Mortuary Access	Does the hospital have a mortuary or access to one?			
27. Drugs/Poison centre	Does the hospital have access to information at a Drug/Poison Centre?			
28. Water and Sanitation	Does the hospital have access to safe drinking stored water?  Does the hospital have access to portable toilets?			

29. Electricity	In the event of a power disruption, does the hospital have access to a generator or any other support system?			
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**Comments :**

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## **Appendix C - Information to the Participants / Hospital CEO's**

### LEVELS OF HOSPITALS' PREPAREDNESS FOR a MASS DISASTER IN KWAZULU-NATAL eTHEKWINI DISTRICT

Dear Participant,

I, Dr Nirvadha Singh have been commissioned by the KZN Department of Health to undertake a project with focus on the level of all the hospitals' preparedness for a mass disaster in the province of KwaZulu-Natal, eThekwini District public sector.

The focus is primarily in preparation for the 2010 Soccer FIFA World Cup. This research study has been approved by the Ethics Board of Review and Postgraduate Committee. Your institution has been selected by the District Office.

This study design is an observational, cross-sectional descriptive study and the type being of a health systems research. The purpose of this study is to ascertain a baseline survey of hospitals within the eThekwini District to assess their readiness for emergency in-hospital management of a disaster.

Participation in this study, although voluntary, will enable the District Office to note any shortcomings and lack of resources in your hospital. This would be important for the implementation of any strategic planning to aid your hospital in preparation for the 2010 Soccer FIFA World Cup.

The key informant interview will not require any personal information from individuals. Should personal information be given, efforts will be made to keep this confidential, however absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law.

The study has been commissioned by the KZN Department of Health and permission has been granted by the eThekwini District Office in the use of this study toward the researchers MMed Public Health. For further information you may contact Dr. N. Singh at the Department of Public Health Medicine at the University of Kwa-Zulu-Natal, Nelson R Mandela School of Medicine, Private Bag 7, Congella, 4013.

To report any complaints please contact the Biomedical Research Ethics Administration University of Kwa-Zulu-Natal, Westville Campus, Private Bag X 54001, Durban, 4000.

## Appendix D- Informed Consent / Consent to Participate in Research

You have been asked to participate in a research study.

You have been informed by Dr Nirvadhya Singh who has been commissioned by the KZN Department of Health to undertake a project with focus on the level of all the hospitals' preparedness for a mass disaster in the province of KwaZulu-Natal, eThekweni District public sector. The focus is primarily in preparation for the 2010 Soccer FIFA World Cup. The study has been commissioned by the KZN Department of Health and permission has been granted by the eThekweni District Office in the use of this study toward the researchers MMed Public Health.

You may contact the Department of Public Health Medicine at the Nelson R Mandela School of Medicine at 031-260 4058 any time if you have questions about the research. You may contact the Biomedical Medical Research Administration at the University of KwaZulu-Natal at 031-260 4769 or [BREC@ukzn.ac.za](mailto:BREC@ukzn.ac.za) if you have questions about your rights as a research subject.

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop. If you agree to participate, you will be given a signed copy of this document and the participant information sheet which is a written summary of the research.

The research study, including the above information, has been described to me orally. I understand what my involvement in the study means and I voluntarily agree to participate.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date

(Where applicable)

\_\_\_\_\_  
Signature of Translator

\_\_\_\_\_  
Date

(Where applicable)

**Appendix E – Participating Hospitals**

Hospitals participating in the study from the eThekweni District have been kept anonymous.

The hospitals as mentioned in the inclusion population were all the tertiary, regional, large and small district hospitals, and the state –aided hospitals within the eThekweni District.

## Appendix F-Letter of Ethics Approval



BIOMEDICAL RESEARCH ETHICS ADMINISTRATION  
 Research Office, Westville Campus  
 Govan Mbeki Building  
 Private Bag X 54001  
 Durban  
 4000  
 KwaZulu-Natal, SOUTH AFRICA  
 Tel: 27 31 2604759 - Fax: 27 31 2604609  
 Email: [BREC@ukzn.ac.za](mailto:BREC@ukzn.ac.za)  
 Website: <http://research.ukzn.ac.za/ResearchEthics11415.aspx>

02 December 2009

Dr Nirvadha Singh  
 PO Box 70573  
 Overport  
 4067

Dear Dr Singh

**PROTOCOL:** Level of Hospital's Preparedness during a mass disaster for the FIFA WORLD CUP 2010 in the eThekweni District of KwaZulu- Natal. Dr. Nirvadha Singh, Dept of Public Health Medicine. REF: BF086/09.

The Biomedical Research Ethics Committee (BREC) has considered the abovementioned application.

The study was approved by a quorate meeting of BREC on 09 June 2009 pending appropriate responses to queries raised. Your responses received on 23 November 2009 to queries raised on 05 November 2009 have been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval** and may begin as from **today; 02 December 2009**.

The protocol and related study documents have been reviewed and approved:

This approval is valid for one year from **02 December 2009**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2004), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/ResearchEthics11415.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The following BREC members were present at the meeting that took place on 09 June 2009:

Professor D Wassenaar	Chair
Professor S Collings	Psychology
Ms T Esterhuizen	Faculty of Medicine
Dr R Govender	Family Medicine
Dr U Govind	General Practice - Private Practitioner
Dr T Hardcastle	Surgery - Trauma
Dr Z Khumalo	KZN Health - External
Professor D Pudifin	Medicine
Professor V Rambiritch	Pharmacology
Dr M A Sathar	Medicine
Prof R Bhimma	Paediatrics and Child Health
Mrs T Makhanya	External
Dr J M Titus	Obstetrics and Gynaecology (Pmb)
Dr S Paruk	Psychiatry
Prof T Madiba	General Surgery
Mr R Moore	Law/UKZN IP Officer

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely



**PROFESSOR D R WASSENAAR**  
Chair: Biomedical Research Ethics Committee

## Appendix G - Letter of Postgraduate Approval



03 November 2009

Dr N Singh  
P O Box 70573  
Overport  
4067

Dear Dr Singh

**PROTOCOL : Levels of Hospitals' Preparedness during a mass disaster for the FIFA WORLD CUP 2010 in the eThekweni District of KwaZulu-Natal**  
Dr Nirvadhya Singh, Student no 9306900. MMed, Public Health Medicine

The Postgraduate Education Committee ratified the approval of the abovementioned study on 03 November 2009

Please note:

- The Postgraduate Education Committee must review any changes made to this study.
- The study may not begin without the approval of the Biomedical Research Ethics Committee.

May I take this opportunity to wish the student every success with the study.

Yours sincerely

**PROFESSOR SR Thomson**  
**Deans Assistant: Postgraduate Education Committee**

cc Dr K Naidoo

Nelson R Mandela School of Medicine, College of Health Sciences,  
Medical Research Administration

Postal Address: Private Bag 7, Congella 4013, South Africa  
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Founding Campus: Edgewood Howard College Medical School Pietermaritzburg Westville