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The Hospital's role within a regional disaster response: A Comparison study of an urban hospital versus a rural hospital

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Thesis:

The Hospital's Role Within a Regional Disaster Response:

A Comparison Study of an Urban Hospital Versus a Rural Hospital

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Abstract

The goal of this research is to evaluate the hospital's role in a regional disaster response. It focuses on identifying the level of the hospital's preparedness and its response to disasters and includes a comparison study between an urban and a rural hospital in New York state. The findings of this work show some differences between the urban and rural hospitals in terms of their capabilities and available resources and the effect of the community infrastructures on their preparedness. Both hospitals have similarities in the way participants view the hospital's role during a regional disaster response. It is noted that the urban hospital has more resources, a better geographical location, staff, medical centers, equipment, and supply management.

Keywords:

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Table of Contents

List of Tables:

List of Figures:

CHAPTER 1

INTRODUCTION

Over the last 20 years, the number of crises has increased significantly. Disasters become a big concern in local and national government (Gilpin & Murphy, 2008). Disasters become a major threat to people's lives and health. The big issue with disasters is that they may happen anytime and anywhere with no previous warning. Disasters have various forms, some natural sources and some manmade. Disasters cause huge challenges for people and organizations in all levels and fields, because disasters can destroy the infrastructures for cities, communities, and organizations.

Hospitals are one of the most important areas that face a big challenge during and after disasters. Many people are injured and die during disasters. According to the U.S. Geological Survey (2012), the estimated number for people who died from earthquakes worldwide from 2000-2012 is 812,600. People died or were injured because houses, buildings, and bridges were destroyed or damaged (USGS, 2012). Injured and sick people may run to or transfer to hospitals for the healthcare they need. At that time hospitals need to provide more healthcare and services for the larger number of injured people who just arrived at the hospitals. Considering the disaster situation, hospitals also may be affected by the disasters—their staff may be injured or unable to get to their hospital, or those hospitals may have a limited capacity and are unable to manage providing placement and care for the additional patients. This scenario may put hospitals in a challenging situation that requires them to be prepared for such hard times.

People, government, and non-governmental organizations have realized the importance of preparing hospital professionals for disasters, protecting the health and safety of staff and patients and providing the best quality healthcare (WHO, 2002). Many disaster management systems and standards, such as the Joint Commission on Accreditation of Healthcare organizations (JCAHO), have been developed to prepare hospitals and non-health organizations to manage and deal with disaster and emergency situations. Even though there are a variety of management systems and guidelines for disaster and emergency situations, there is still a difference between hospitals in terms of their preparedness for disasters, which reflects how some hospitals have a different level of management system than others (FEMA, 2006). Differences are in many areas, such as the hospital's capability to perform the identified tasks, characteristics, and management styles; these differences are affected by the size and location of the hospital and its community (Corbaley, 2010).

1.1 Background

1.1.1 Disasters

Disasters occur without warning and can turn normal daily routines into major and complicated events (Baker, 2007). Disasters take different forms such as earthquakes, floods, tsunamis, hurricanes, tornadoes, and terrorist attacks. There are many examples of disasters that happen all around the world. The United States has faced many crises such as the terrorist attack of September 11th and Hurricane Katrina in August 2005. Also, there are other examples for disaster events that have occurred in our world including the tsunami that struck the Japan coast

in March 2011; the flood in Pakistan and Afghanistan in July 2010; the 7.0 Mw earthquake in

Leogane Haiti on January 12, 2010; the 8.8 Mw earthquake off the coast of the Maule Region of

Chile on February 27, 2010; and the 2004 Indian Ocean tsunami in the Far East affecting

Indonesia, Sri Lanka, India, and Thailand (WHO, 2011) (U.S. Geological Survey, 2012).

According to the United Nations Disaster Management Training Manual (DATM),

disaster by definition is "the serious disruption of the functioning of a society, causing

widespread human, material, or environmental losses which exceed the ability of affected society

to cope using only its own resources" (UN, 2010). Moreover, according to the Joint Commission

on Accreditation of HealthCare Organizations (JCAHO), which is an organization that develops

hospital management systems and standards, a disaster is defined as a community-wide event

that disrupts the healthcare system and critical infrastructure of the community (Bonnett et al.,

2007). So, from these definitions, the term disaster is used to describe a series of events that

affect people's lives and community for a period of time. Also, there are more helpful definitions

in one of the following subchapters.

1.1.2 Hospitals

Identifying and understanding a problem is an important step toward better management.

It also is very important in understanding the critical and essential tasks of the organization to

efficiently and cost-effectively manage service outcomes. Hospitals are large and complex

workplaces that have large numbers of employees from different technical, medical, and

professional fields. Healthcare staff includes management, maintenance, and transportation staff

as well as employees from other supporting departments. They all work for hospitals to ensure

successful and comprehensive services of healthcare for patients. Moreover, besides the

hospitals' core business function of providing medical care to patients, hospitals provide essential support services such as educating community members who assist people during disasters, injury and illness prevention, health examination, and disease notification (Sadleir, n.d.).

Hospitals have differences in terms of their classification, capability to perform tasks, characteristics, and management styles, as each facility has various levels of medical care they are prepared to provide to patients (Slepski, 2007). For example, these differences are usually affected by the size and strategy of that facility, because a big hospital can take in more patients, and the hospital's strategy can improve the hospital's achievements and services. Healthcare facilities are generally classified into three types, including community hospitals, medical centers, or specialty hospitals (Slepski, 2007). Nearly all communities, especially large and urban communities, have all three types of facilities (Slepski, 2007). Community hospitals provide basic short-term care for their patients, such as outpatient clinics and some small surgeries. The emergency services are at a lower level compared to most medical centers (Slepski, 2007).

A medical center is larger than a community hospital and provides more advance healthcare services and treatments, such as cardiac surgeries, cancer treatments, and brain surgeries. It is open 24 hours, has advance emergency services and a full range of medical specialists, such as cardiac surgeons, neurosurgeons, and chemotherapists (American College of Surgeons: Committee on Trauma, 2010). Specialty hospitals usually provide specialized medical care, such as medical treatments for cancer patients, psychiatric therapy for mentally ill patients, inpatient counseling for drug addiction, various types of rehabilitation, or even short-term medical care (McGraw-Hill Concise Dictionary of Modern Medicine, 2002). This classification helps to serve the different care people need in the community.

Because of the important roles that hospitals play for people and communities in general and during disasters in particular, they need to be prepared structurally and functionally to be able to respond effectively to people's needs. According to the World Health Organization (WHO), hospitals and healthcare facilities are one of the most important areas that need to be protected from disasters. Over 500 hospitals have been destroyed by the flood-affected areas of Pakistan, including urban areas. Also, many healthcare facilities were severely damaged in Haiti's earthquake (WHO, 2010). These recent examples and other events have stimulated WHO and other organizations to create and develop ideas and techniques for better emergency planning and preparedness (EPP) for safer and stronger hospitals, so hospitals will not be affected or destroyed easily during disasters, which will allow hospitals to continue to provide services for the community.

1.1.3 Hospital Disaster Management Systems

Hospital disasters management systems have changed and improved to help hospitals mange and provide better services. Nowadays, most hospitals conduct regular assessments to evaluate their level of preparedness in responding to disasters. Each hospital uses evaluation checklists, systems, guidelines, or standards that are preferred by the hospital management team. The main goal of using them is to guide and prepare the hospitals' management and staff to deliver care for patients in unusual emergency situations where each employee should know what to do as well as when and where to go. However, the good thing about most of these emergency preparedness management systems is going further than the response stage to the improvement and recovery stages.

1.2 Research Questions

This research compares and evaluates the issues and differences between urban and rural hospitals in terms of dealing with disasters by identifying the:

- Hospital's role within a regional disaster response

- Hospital's role as a part of the community infrastructure

- Differences between hospitals' level of preparedness and response during disasters

1.3 Research Focus

This work focused on evaluating the hospital's role during a regional disaster response. It included also a comparison study on a rural and an urban hospital within the same metropolitan statistical area (MSA)—one is an urban-designated trauma and research center and the other is a rural hub community hospital. The level and characteristics of EPP were compared through this case study. EPP information was collected through a structured interview process with key individuals within both hospitals and jurisdictional emergency management personnel. The case studies were conducted on an urban and a rural hospital in Rochester, New York.

1.4 Definitions

Disaster is the serious disruption of the functioning of a society causing widespread human, material, and/or environmental losses that exceed the ability of the affected society to cope using only its own resources (UN, 2010).

Disaster management is planned steps taken to minimize the effects of a disaster and be able to proceed to the business continuity stage. See also business continuity plan (Businessdictionary, 2011).

A community hospital is usually located in a smaller community and is a basic hospital that provides short-term patient care (McGraw-Hill Concise Dictionary of Modern Medicine, 2002). The emergency services at these healthcare facilities are usually at a lower level, consisting of only a trauma-trained nurse and general emergency-service physicians.

A medical center is larger than a community hospital and provides more complex medical services and treatments. Trauma centers have a full range of medical specialists and equipment available 24 hours a day, and provide the highest level of surgical care to trauma patients and considered as a referral source to its community (American College of Surgeons: Committee on Trauma, 2010).

Specialty hospitals are located throughout the community. They provide specialized medical care such as chemotherapy and medical treatments for cancer patients, provide psychiatric therapy for mentally ill patients, provide inpatient counseling for drug addiction, provide various types of rehabilitation, or even provide short-term medical care (McGraw-Hill Concise Dictionary of Modern Medicine, 2002).

Emergency: Any incident, whether natural or manmade, that requires responsive action to protect life or property. Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, an emergency means any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States (FEMA, 2011).

Emergency Management is a subset of incident management, the coordination and integration of all activities necessary to build, sustain, and improve the capability to prepare for, protect against, respond to, recover from, or mitigate against, threatened or actual natural disasters, acts of terrorism, or other manmade disasters (FEMA, 2011).

Incident Command System (ICS) is a standardized on-scene emergency management construct specifically designed to provide for the adoption of an integrated organizational structure that reflects the complexity and demands of single or multiple incidents without being hindered by jurisdictional boundaries. ICS is a management system designed to enable effective incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organize field-level incident management operations (FEMA, 2011).

Incident Commander is the individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. The Incident

Commander has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site (FEMA, 2011).

National Incident Management System (NIMS) is a system that provides a proactive approach guiding government agencies at all levels, the private sector, and non-governmental organizations to work seamlessly to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life or property and harm to the environment (FEMA, 2011).

Major Disaster: Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought) or, regardless of cause, any fire, flood, or explosion in any part of the United States that, in the determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of states, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby (FEMA, 2011).

Resources include personnel and major items of equipment, supplies, and facilities available or potentially available for assignment to incident operations and for which status is maintained. Under the National Incident Management System, resources are described by kind and type and may be used in operational support or supervisory capacities at an incident or at an emergency operations center (FEMA, 2011).

Planning Section:

(1) Incident Command is the section responsible for the collection, evaluation, and dissemination of operational information related to the incident and for the preparation and documentation of the Incident Action Plan. This section also maintains information on the current and forecasted situation and on the status of resources assigned to the incident (FEMA, 2011).

(2) Joint Field Office is the section that collects, evaluates, disseminates, and uses information regarding the threat or incident and the status of Federal resources. The Planning Section prepares and documents Federal support actions and develops unified action, contingency, long-term, and other plans (FEMA, 2011).

Preparedness includes actions that involve a combination of planning, resources, training, exercising, and organizing to build, sustain, and improve operational capabilities. Preparedness is the process of identifying the personnel, training, and equipment needed for a wide range of potential incidents and developing jurisdiction-specific plans for delivering capabilities when needed for an incident (FEMA, 2011).

Response: Immediate actions to save lives, protect property and the environment, and meet basic human needs. Response also includes the execution of emergency plans and actions to support short-term recovery (FEMA, 2011).

Recovery: The development, coordination, and execution of service- and site-restoration plans; the reconstitution of government operations and services; individual, private-sector, non-governmental, and public-assistance programs to provide housing and to promote restoration; long-term care and treatment of affected persons; additional measures for social, political, environmental, and economic restoration; evaluation of the incident to identify lessons learned;

post-incident reporting; and development of initiatives to mitigate the effects of future incidents

(FEMA, 2011).

Disaster Recovery Center (DRC): A facility established in a centralized location within or near

the disaster area where disaster victims (individuals, families, or businesses) apply for disaster

aid (FEMA, 2011).

CHAPTER 2

LITERATURE REVIEW

Hospitals are the main healthcare providers that people will run, transfer, or be transported to, in order to receive the healthcare they may need. Taking into consideration the role of hospitals during disasters, when facing unusual challenges such as the high patient load, lack of healthcare staff, and lack of necessities that hospitals need to operate properly such as electricity, drinking water, food, and medicines, we can imagine the kind of crisis that might happen to people who are unable to receive the proper healthcare. This literature review focuses on hospitals' preparedness in responding to disasters, how hospitals function with the challenges, and what disaster management standards and systems are available for hospitals today.

2.1 Disasters types and sources:

There are many kinds of disasters that people may face. Some may take a long time, and some may happen instantly with no warning. Linke (1989) classified crises that could impact people and organizations into four types: an immediate crisis, a building crisis, a continuing crisis, and an exploding crisis (Linke, 1989). Also, as shown in the following table (table 1), Gilpin and Murphy (2008) and Farazmand (2007) followed the same classification (Farazmand, 2007) and (Gilpin and Murphy, 2008).

Crisis Type	Description	Example
Immediate Crisis	Occurs quickly without warning	The United States financial organization or threats from another country
Building Crisis	Continues to grow until a crisis forms	Consistent in the current housing market or the US economy
Continuing Crisis	Assembles slowly over time and difficult to dissolve	Niger's political and constitutional crisis
Exploding Crisis	A natural or manufactured disaster, with or without warning	Hurricane, flood, earthquake, tsunami, or terrorist attack

Table 1: Types of Crises (Farazmand, 2007) and (Gilpin & Murphy, 2008).

Identification of disaster type is essential to evaluating the problem and focusing on strategy. In his study Corbaley (2010) focused on the effect that the exploding crisis can have on healthcare facilities and organizations, as this type of crisis happens more often and can cause horrific wounds, damage, destruction, and loss of lives (Corbaley, 2010). Corbaley also stated that an exploding crisis can happen from a hurricane, flood, earthquake, tsunami, power outage, tornado, or terrorist attack. He suggested that organizations must understand the nature of crisis, the definition of crisis, and the exploding crisis specifically in terms that allow them to be able to respond to that crisis (Corbaley, 2010). This paper focused generally on exploding disasters.

2.2 Hospital disaster preparedness

During disasters there will be a huge number of injured and deaf people who will need to receive the proper care and attention. Even people who may lose their homes might run to hospitals or shelters until they find a place to live. The important roles that hospitals can play

during disasters to save people's lives give hospitals a challenging responsibility that requires them to be prepared for such hard times.

In an influential article, Bert Sadleir (n.d.) stated some important facts about hospitals. He declared that hospitals are considered to be large organizations that depend on a large number of employees from different professions in order to operate effectively. Hospitals function by medical staff, management staff, maintenance staff, and other support departments. These varieties in workers' jobs and numbers make hospitals complex organizations to manage. Health management systems need to be prepared to operate during the time of disasters. Therefore, hospitals should have their emergency management plans ready in advance for whatever emergency may happen that requires hospital to operate in an unusual way (Sadleir, n.d.).

In 2010 the World Health Organization (WHO) stated in the International Day for Disaster Reduction that hundreds of hospitals and clinics in Pakistan were destroyed in floods. WHO stated also that Haiti's earthquake and other disaster threats on healthcare services all over the world in both its urban and rural areas. WHO called on governments and international organizations to ensure existing and new healthcare facilities are strong enough to survive earthquakes, floods, cyclones, and other manmade disasters (WHO, 2010). "Hospitals, clinics and other health facilities are the foundation of any health response to be launched to save the lives of people injured when their city is struck by a disaster, but we see too often that when disasters happen, health facilities and the staff who work in them count among the casualties" says Dr. Eric Laroche, WHO Assistant Director-General for Health Action in Crises (WHO, 2010).

WHO stated that during disasters it is hard for unprepared hospitals to operate effectively and save people's lives. For each ineffective hospital there are approximately 200,000 people without healthcare for months and sometimes years (WHO, 2010). Moreover, WHO recommends governments, public, private, and community sectors to consider the following steps to protect hospitals from disasters (WHO, 2010):

- Build new hospitals in safe areas not prone to disasters and construct them in compliance with building standards.
- Local governments should work to safeguard existing hospitals before disasters occur.
- Prepare emergency programmers by hospital managers and provide adequate training for staff for their critical roles when an emergency strikes.
- Develop response plans and systems that ensure all public, private, and community sectors coordinate and work effectively in disasters to minimize loss of life and suffering.

2.3 Hospital emergency management systems

Since hospitals have a big role during disasters, they need to be prepared for that challenge. Since hospitals are complex organizations with a variety of professionals, each employee should be prepared to know what to do during disasters. Employees need to be trained, tasks should be clear, and facilities need to be prepared.

Fagbuyi and Upperman (2009) discussed the role of hospital managers in dealing with crisis situations. As a result of a survey conducted in 2007 by the members of the American

Pediatric Surgical Association, they found that managers and frontline leaders with proper training and preparedness were almost four times better in responding to disasters than managers with no previous preparedness. Also, Fagbuyi and Upperman found that hospital managers and staff with defined responsibilities and roles were almost five times better in responding to disasters than managers who has no identified roles (Fagbuyi and Upperman, 2009).

As a director of Emergency Medicine at Mackay Base Hospital, Sadleir stated that it is important for hospitals to have strong and clear standards for managing the environment and health and safety issues. Hospitals have many environmental and health and safety issues that staff need to be aware of. Hospitals have a lot of workplaces where workers have high levels of potential exposure to a large variety of dangers such as biological, chemical, physical, and psychological. Hospital employees should be aware of how they can protect their own health and safety as well as protect their patients from all potential risks. Also, hospitals can extend their efforts to protect their communities and neighborhoods from all environmental and health and safety issues such as disease prevention, health examination and disease warning, disaster management, and environmental protection through the proper way of managing their wastes (Sadleir, n.d.).

Sadleir also discussed that environmental health issues relating to hospitals can be easily divided into four parts: staff, patient, community, and environmental protection. He stated that hospitals have a major role in disaster management, as those disasters result in multiple victims. Hospitals should have a Hospital Disaster Committee that is responsible for the preparedness and planning, reviewing and testing the plan with mock drills. This committee should ensure the effectiveness of backup power and water supplies after disasters (Sadleir, n.d.).

It is important for employees to know what to do and to be familiar with what a worker needs to know during regular work time. However, during a crisis the importance of knowing what to do or where to go becomes more important because of limited time and resources and the need to take quick actions to protect peoples' lives. In the article, Emergency Communications and Disaster Response, David Page (2006) mentioned the importance for employees to be familiar with the tasks they need to do during the crisis time because if they were unfamiliar with their tasks, then they definitely are going to fail in doing their jobs at the time of the disaster. He said that employees need to know their tasks, how to do them, and what to do if something was missing that they needed in order to do their work and where to go if they needed additional support or information (Page, 2006).

Corbaley argued that hospitals should set up the standards of their preparedness to be able to deal effectively with crisis (2010). Corbaley said that most of the preparedness for crisis in healthcare facilities may not be enough to meet the minimum level. Hospitals need to set up a higher level for preparing for crisis (Corbaley, 2010). She also provided recommendations for hospitals and healthcare facilities for effective performances and preparedness (Corbaley, 2010):

- Set up high levels for disaster preparedness.
- Provide training for leaders and employees; this training should fit with some important issues such as culture, regulations, and leadership structure.
- Identify the "potential" leaders.
- Understand the classifications of the facility.
- Provide education and training for the identified tasks.
- Leaders must be fully prepared to deal with disasters when they occur.

Corbaley (2010) discussed the three stages that organizations' higher leadership should consider when dealing with and managing disasters as shown in figure 1. These three stages are assessment stage, planning stage, and implementation stage. Each stage requires different responsibilities and steps from the senior leaders whom they need to understand and follow correctly (Corbaley, 2010).
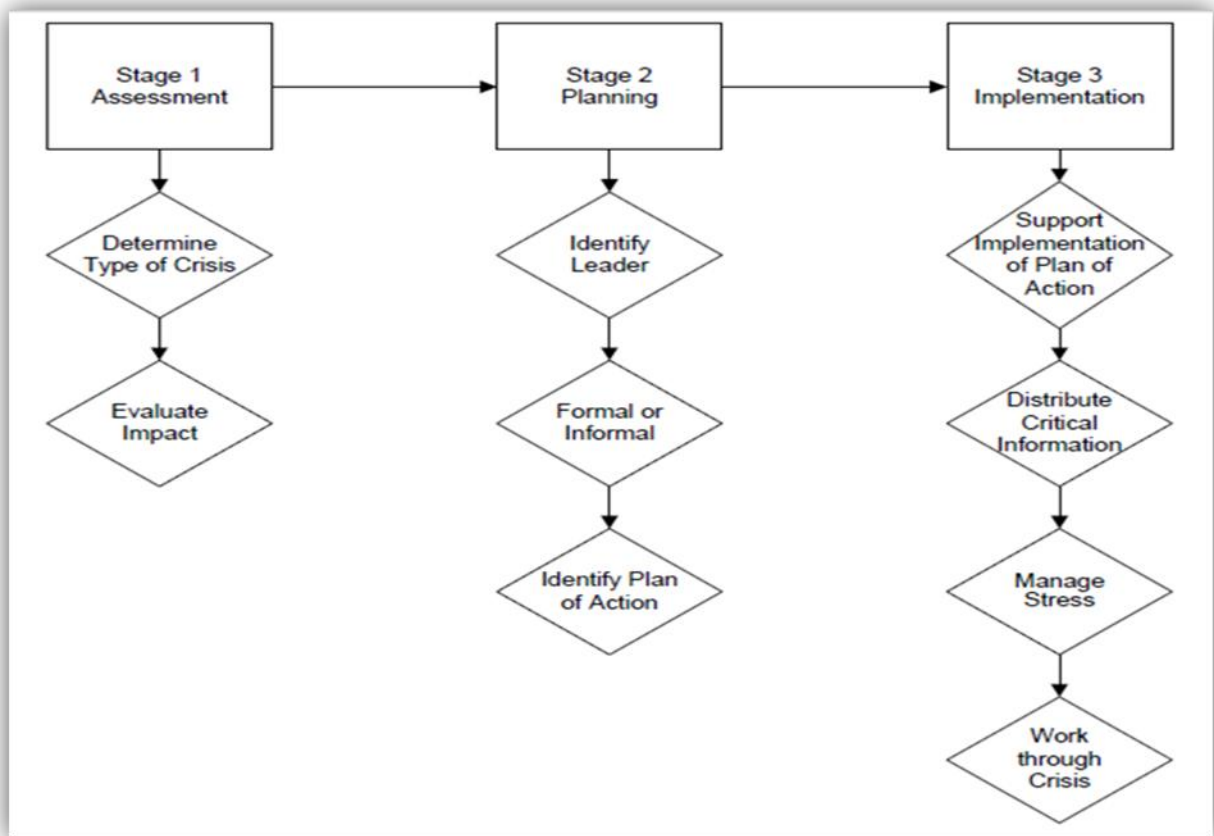
Figure 1: The three stages and leadership's responsibilities (Corbaley, 2010).

Furthermore, Corbaley discussed and identified the roles and responsibilities of the middle and lower-level managers or the frontline leaders as she named them. Corbaley focused on the role of frontline managers during disasters, their tasks, characteristics, and style. Then she classified their roles according to the stage of the crisis as shown in table 2 (Corbaley, 2010).

Stages	Tasks	Characteristics	Styles
Assessment	Recognize unexpected events Perform current and new crisis job duties Assess which plan of action to use Share information with team members	Goal and vision Experience Adaptive capacity Responsibility Integrity Trust Training and preparedness	Transformational leadership Charismatic leadership
Planning	Determine which plan and action to implement Decide if a contingency plan needs implementation	Facilitation Intuition Decisiveness Prioritization Coordination	Crisis management
Implementation	Implement plan of action and emergency response plan Ensure enough staff Guarantee plenty of supplies Manage stress	Communication Active listening skills Critical thinking skills Open-mindedness Stress management	Contingency approach Situational leadership

Table 2: The role of frontline managers in the three stages of crisis (Corbaley, 2010).

In the article *Providing Critical Care During a Disaster: The Interface Between Disaster Response Agencies and Hospitals* (2006), Farmer and Carlton detailed some of the important issues that hospitals need to consider as preparedness steps for disasters. They discussed the lack of communication and coordination that happens between the disasters' agencies and hospitals, the ability of hospitals to provide care in emergency situations, and they discussed some issues

that relate to staff training and preparation. Also, Farmer and Carlton discussed hospitals'

management strategies in prioritizing and comparing the importance of disaster management to

some other areas in hospitals.

As a result of their article, Farmer and Carlton recommended that hospitals extend their

preparedness beyond their normal response phase. This can be done by planning for disaster

situations, providing adequate training, and identifying the roles and tasks of leaders and staff

during crisis (Farmer and Carlton, 2006).

In the paper, *Principles of Emergency Management Supplement*, Dr. Wayne Blanchard of

FEMA's Emergency Management Higher Education Project, at the direction of Dr. Cortez

Lawrence, Superintendent of FEMA's Emergency Management Institute, convened a working

group of emergency management practitioners and academics to consider principles of

emergency management (FEMA, 2007). The group identified the principles of the emergency

management supplement for the Comprehensive Emergency Management Model. The group

stated that modern emergency management is based on four phases of emergency management:

mitigation, preparedness, response, and recovery (FEMA, 2007).

Mitigation consists of those activities designed to prevent or reduce losses from disaster.
It is usually considered the initial phase of emergency management, although it may be a
component of other phases. Preparedness is focused on the development of plans and
capabilities for effective disaster response. Response is the immediate reaction to a
disaster. It may occur as the disaster is anticipated, as well as soon after it begins.
Recovery consists of those activities that continue beyond the emergency period to
restore critical community functions and manage reconstruction.

Moreover, the group stated that planning is necessary for each phase. The group said it is usually difficult to define the boundaries between phases and unclear when a phase ends or starts (FEMA, 2007).

2.4 Standards, systems, and checklists

Standards and guidelines are important steps that hospitals can follow as a guide for their management systems. They are helpful tools that allow hospitals to ensure better performance during disasters. They can help managers identify the important tasks and areas that need to be covered before, during, and after disasters. There are many organizations that have participated in creating and developing some of these standards, as they understand the need for being prepared.

The United Nations World Disaster Reduction (UNDP):

On the International Day for Disaster Reduction and under the theme of the United Nations World Disaster Reduction Campaign: "Reduce risk, protect health facilities, save lives" The government of India and the United Nations Development Program of India published new guidelines. The first one is "Guidelines for Hospital Emergency Preparedness Planning" and the second is "Guidelines for Seismic Safety of Non Structural Elements and Contents in Hospital Buildings." These two guidelines aim to improve the preparedness in dealing with and managing hospitals during and after disasters (UNDP, 2008).

The first guideline provides hospital managers with clear steps to help them create the proper plans for their hospitals. Plans should work smoothly and effectively during a crisis even with the requirements and limitations of the hospital's human resources and infrastructure. The second guideline aims to help the hospital administration and staff to identify and minimize the risks that may happen by non-structural building components, such as furnishings, equipment, and instruments (UNDP, 2008).

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO):

The New York City Health and Hospitals Corporation (HHC) discussed the benefits of the JCAHO approach to evaluation of emergency management (2006). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) revised the EC 4.20 Emergency Management Drill Standard and the New Emergency Management Tracer. The JCAHO required hospitals to improve the planning and evaluation of their emergency management drills to ensure the effectiveness of the emergency response in hospitals as preparing steps for disasters. Also, the JCAHO requires hospital managements to use the Plan, Do, Check, and Act as a management methodology to help hospitals continually improve their emergency management system. JCAHO activities, the Environment of Care (EOC), and the Emergency Management System Tracer (EMST) are required for the hospital's emergency management system. The EOC is designed for hospitals with less than 200 beds, whereas the EMST is for hospitals with more than 200 beds (NYC, 2006).

The National Incident Management System (NIMS):

The Federal Emergency Management Agency (FEMA, 2006) stated the importance of using the National Incident Management System (NIMS) by organizations in all levels. This system was developed to enhance management and cooperation among all agencies and entities, to be applicable for all levels of organizations, and to help organizations improve their preparedness in dealing with crisis. Also, NIMS was designed to include the best existing processes and standards into one nationwide disaster management system (FEMA, 2006). Moreover, FEMA strongly emphasized the importance for hospitals and healthcare facilities to seriously work toward implementing the full NIMS and consider all of its elements.

The Incident Command System (ICS):

The Incident Command System (ICS) was discussed by FEMA in its website. FEMA stated that ICS is an important system that needs to be considered by all private, public, and governmental organizations. ICS was developed to manage organizations during emergencies by focusing on these five areas: command, operations, planning, logistics, and administration (FEAM, 2011). The use of these activities during a crisis depends on the case and the need for using them, as they may not be used in each time of emergency.

FEMA indicated the flexibility of using ICS with any type of incident. The ICS is a standardized management system (FEMA, 2011) that:

- Allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.

- Enables a coordinated response among various jurisdictions and functional agencies, both public and private.

- Establishes common processes for planning and managing resources.

However, FEMA stated that the size and scope of ICS in healthcare facilities will vary depending on the size and structural ability of hospitals. Also, a hospital should add ICS into its systems, as it can help a hospital provide continual healthcare to their patients because of its flexibility (FEMA, 2006).

The Occupational Safety and Health Administration (OSHA):

The Occupational Safety and Health Administration (OSHA, 1997) clarified in its booklet (OSHA 3152) some of the important issues that hospitals should be aware of and follow as preparedness for disasters. OSHA's preplanning steps include: elements of a hospital emergency response plan, training employees, performing emergency drills, documenting training, defining personnel roles, responding to emergencies, selecting PPE, selecting respirators, and decontaminating patients. However, OSHA identified the elements of hospitals' emergency response plan that hospitals should apply during emergencies, especially when hospitals are involved in a hazardous substance incident (OSHA, 1997):

- Pre-emergency drills implementing the hospital's emergency response plan.

- Practice sessions using the Incident Command System (ICS) with other local emergency response organizations.

- Lines of authority and communication between the incident site and hospital personnel regarding hazards and potential contamination.

- Designation of a decontamination team, including emergency department physicians, nurses, aides, and support personnel.

- Description of the hospital's system for immediately accessing information on toxic materials.

- Designation of alternative facilities that could provide treatment in case of contamination of the hospital's Emergency Department.

- Plan for managing emergency treatment of non-contaminated patients.

- Decontamination procedures and designation of decontamination areas (either indoors or outdoors).

- Hospital staff's use of PPE based on routes of exposure, degree of contact, and each individual's specific tasks.

- Prevention of cross-contamination of airborne substances via the hospital's ventilation system.

- Air monitoring to ensure that the facility is safe for occupancy following treatment of contaminated patients.

- Post-emergency critique of the hospital's emergency response.

The National Association of Public Hospitals and Health Systems (NAPHHS):

The National Association of Public Hospitals and Health Systems (NAPHHS) conducted a survey (2007) in response to study the challenges that hospitals face during disasters. NAPHHS focused their emergency preparedness survey on the following issues (NAPHHS, 2007):

- Structural surge capacity plans

- Provisions for staff and their families

- Identifying and credentialing additional healthcare professionals

- Emergency preparedness training strategies for hospital personnel

NAPHHS members wanted to use the results of this survey to allow them to develop disasters surge capacity plans to ensure better performance during crisis (NAPHHS, 2007).

The CommandAware:

Disaster management is an important task that required hospitals' managers to use the right tools, systems and techniques that allow them to save people's lives and provide the best healthcare for their patients. *The Bioterrorism Week*, a magazine that focuses on emergency management systems, published an article discussing the CommandAware resource management platform (ProQuest, 2009). This comprehensive disaster management system allows hospital managers to effectively manage and operate hospitals in a better way to ensure health and safety for their patients and staff. This platform provides effective communication among hospitals and county agencies to respond collaboratively by providing real time bed and resource availability updates and Incident Command System communications (ProQuest, 2009).

The Bioterrorism Week stated that the CommandAware is one of the most comprehensive adopted emergency management systems available to hospitals today. More than 250 facilities and government bodies in the United States have implemented it, as this system can work properly with all kind of disasters including preparation, mitigation, response, and recovery (ProQuest, 2009).

Hospital Safety Index:

Assessing hospitals to function effectively during disasters is an important issue. The Pan American Health Organization (PAHO) published an article that represents the advantages of using the Hospital Safety Index. It is based on a method of calculation that allows hospitals to assess their safety and be prepared before disasters. PAHO says that the Hospital Safety Index can evaluate the ability of hospitals to operate during a crisis based on evaluating the following: structural, non-structural, and functional factors, which include the environmental, health and safety issues. PAHO listed the following advantages of using this index (PAHO, 2011):

- A fast, dependable and inexpensive tool.

- Uncomplicated and easy to apply, train, and learn by hospitals 'employees.

- Easy calculation steps.

- Results include the safety level based on structural, nonstructural, and functional components.

- 145 items or areas are assessed.

- Health facilities fall into one of three safety categories: High, Average, or Low.

In October 2010 WHO articulated in its report for the International Day for Disaster Reduction that the results of a recent evaluation showed that 36% of 327 hospitals in 17 Americas countries that are using the Hospital Safety Index had a high probability of remaining functional following a disaster. Also, about 16% of hospitals in the Americas did not save enough lives of patients and health employees in a disaster (WHO, 2010).

Hospital Emergency Management Program Checklist:

The California Hospital Association (CHA), as one of the leaders in Health Policy and advocacy, published the Hospital Emergency Management Program Checklist. CHA wants this checklist to provide guidance for hospital in terms of dealing with and preparing for disasters. CHA stated that the elements' order of this checklist is not mandated. Also, hospitals should review the Joint Commission (TJC) Emergency Management Standards, as the checklist does not include all elements of the TCS (CHA, 2008).

Summary:

Many organizations have created and developed standards and guidelines to help hospitals to manage and improve their preparedness level for disasters. JCAHO, FEMA, UNDP, OSHA, and NAPHHS are big players in improving the hospitals' standards and management systems. These organizations keep updating their standards constantly to cover any area in the hospitals' emergency management systems. There are many standards to help hospitals plan and prepare for disasters, improve the emergency management structure, improve the hospital's surge capacity, and improve their communication network and training. In addition, there are standards for reviewing the implemented systems. Even though there are many standards for different areas, they all complete each other in terms of improving the hospitals' management systems.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter explains the methodology and procedures for this paper, including the following sections, intent of paper, subjects in the study, research design, data collection procedures, data analysis and interpretation, limitations, and summary.

3.2 Paper Intent

Hospitals have a big role during disasters. This important role requires hospitals to act in certain ways to be able to manage and provide the best healthcare for their patients and communities. The main goal of this case study is to evaluate the role of hospitals during disasters and as a part of the community infrastructure and also to compare and contrast how urban and rural hospitals manage and deal with disasters in terms of their preparedness and response to disasters. This case study was conducted on two hospitals in the region of greater Rochester, New York.

As mentioned previously in this paper, there are many important issues and facts regarding hospitals that need to be considered. First, hospitals are one of the most important areas that face a big challenge during and after disasters. Hospitals at that time need to operate on

a larger scale than on a usual operation day to be able to provide care for their inpatients and the injured people who just arrived at the hospitals. Moreover, in addition to their main business of providing healthcare for patients, hospitals also have a responsibility to provide support and protection for their communities through helping people during disasters, injury and illness prevention, health examination, and disease notification. Also, hospitals are large, complex workplaces with a large number of employees from different levels and professional fields. Hospitals have some differences between them in terms of their classification, capability to perform tasks, characteristics, and management styles, as each facility has various levels of medical care they are prepared to provide patients (Slepski, 2007).

3.3   Subjects of the study

This methodology conducted case studies in an urban and a rural hospital in the Greater Rochester area in New York state. Conducting the studies on hospitals in the same area can give us a better evaluation, as both urban and rural hospitals should have experienced nearly the same kind of disaster events in that geographical area.

The first hospital is one of the biggest hospitals in its region. It located in an urban area in New York state. It is considered a regional leader in healthcare and is located in a county with a population of approximately 744,344 (Census, 2010). It is a big general medical and surgical hospital with 538 beds and approximately 32,300 admissions yearly. This hospital is served by more than 1,500 medical and dental staff members and more than 7,000 employees and has 24/7 emergency services that provide emergency healthcare for 100,826 patients each year. It is

accredited by the Joint Commission (JC) and the Commission on Accreditation of Rehabilitation Facilities (CARF). Also, it has been designated by New York State and The Joint Commission (TJC) as an accredited Stroke Center (USNews, 2011).

The second hospital is located in a rural area near Rochester, NY. It is a general medical and surgical hospital with 113 beds and services a community with over 107,931 residents in its county (Census, 2010). It has emergency services with almost 27,042 patients visiting the hospital's emergency room.. The hospital has 5,122 admissions a year. It is accredited by the Joint Commission (JC) and in 2010 was awarded the Magnet Re-designation by the American Nurses Credentialing Center (ANCC) (USNews, 2011). The following table compares the two hospitals in terms of their capabilities:

Area of Comparison	Rural Hospital	Urban Hospital
Geographic Location	A rural Area	An urban Area
County Population\ Residents #	107,931	744,344
Number of Beds \ Year	113	528
Admissions \ Year	5,122	32,356
Emergency Room Visits \ Year	27,042	100,826
Outpatients Encounters \ Year	747,246	1,159,000
Medical & Dental Staff	215	1,500

Table 3: Capabilities comparison

3.4 Research Design

For a researcher to be able to define the correct research design and deal accurately with the research data, a researcher should first know and identify the kind of data for that research. A researcher should know if that data is qualitative or quantitative, as that step is important for the researcher (Colorado State University, 2012).

The data gathering for this case study started through creating qualitative interview questions. Scientists and researchers state that conducting case studies as a research method for comparative studies is a very helpful tool as it help researchers to understand some of the complex issues regarding their research. Case study can be used to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods. It can also help researchers to add strength and clarification to the findings in their literature reviews (Soy, 1997).

The research design was a descriptive qualitative research design with narrative analysis. Narrative analysis builds on a real-life narrative data that can allow the researcher to explore the related nature of a situation (Denzin & Lincoln, 2005). The qualitative approach is a useful way to conduct an in-depth interpretation. It helps researchers to get a deep and cumulative understanding of the data for that case study. Descriptive research methods are described sometimes by the "survey studies" (Isaac & Michael, 1997). Survey studies can include many different forms such as one-on-one interviews, focus group interviews, mailed questionnaires, electronic questionnaires, and telephone interviews (Creswell, 2005). This case study used open-

ended interview questions, and due to the type of interview questions, this work used the qualitative approach in the first stage of this study.

In addition, after coding the data and dividing them into three categories, the research design included a quantitative approach, as we needed to show the percentages for the coded data and the data categories. Hence, the design of this research includes both qualitative and quantitative data, because of the type of interview questions used and also the way of coding and categorizing this data. The data analysis section will show clearly how we coded and analyzed the data.

3.5   Data collection procedures

The main data collection methods for this case study were based on a documentation review of each hospital's emergency plans and the feedback through interviewing participants from both hospitals and external parties to the hospitals.

This case study was developed by interviewing some individuals in each hospital from different positions and departments including hospital management, disaster management, medical staff, and support staff. The purpose of interviewing more than one individual within the same organization is to understand the different responsibilities and roles each one may have during disasters, which can provide us with more understanding on how employees view their responsibilities and respond during disasters.

However, since each hospital is part of a region that has its own regional emergency system, we considered gathering possible valuable information from some external individuals or organizations such as the regional emergency or disaster manager, regional health department, hospital users (patients), and any other related external parties. Two county emergency offices participated in this case study, as each one of them belongs to the same county for each hospital. The following table shows the percentages based on a total of 16 participants:

	Rural Hospital	Urban Hospital	External Parties
Percentage of Participants	31.25%	56.25%	12.5%

Table 4: Percentage of participants in interviews

In addition to gathering information from interviewing some of the internal and external parties to the hospitals, the existing disasters plans and standards that both hospitals have as a part of their management system were reviewed too, such as the standards of Joint Commission Accreditation of Health Organizations (JCAHO) or other helpful standards that hospitals use to manage their system during disasters.

According to Yin (2003), the researcher in a qualitative research serves as an instrument for providing the measurement for data analysis such as providing the interview questions. Also, individual interviews served as the main data gathering measure to obtain information. The same open-ended questions were used in all interviews. All interviews were audio-recorded, and field notes were taken during and at the end of each interview. We conducted five interviews in the rural hospital and nine interviews in the urban hospital; however we were able to get saturation

of data from these interviews. All interview audio-records were typed in transcript format for better and easer evaluation and analysis.

The following questions were created by professional researchers to assure the outcomes of the interviews. These questions are used with all interviews:

1. What are your thoughts about the hospital's role within a regional disaster response?
2. What are your thoughts about how related emergency responders and the local community view the hospital's role within a regional disaster response?
3. What are your thoughts about the hospital's readiness to assist with the community's response to a regional disaster?
4. Who is your liaison within the local Incident Command System?
5. What are your thoughts about the capabilities of the hospital to interact with other hospitals, healthcare institutions, and disaster response organizations during a regional disaster response?
6. What do you think are the top priorities the enable the hospital to improve these interactions during a regional disaster response?
7. What do you think is the hospital's role in contributing to the community's recovery after a regional disaster?
8. Do you have any suggestions for improving the internal/external interactions during a regional disaster response?
9. Do you have any suggestion for improving the hospital's capabilities for responding to the region's recovery/resiliency after a regional disaster?

10. Do you think that the hospital is an essential component of the regional Critical Infrastructure Systems?

11. Do you think that there is a difference in the regional disaster response roles for the rural hospital vs. the urban hospital?

3.6 Data Analysis and Coding

Data analysis is an important step in the research since collected data will start making sense to the researcher (Stake, 1995). Moreover, it is essential for a researcher to have a clear strategy and steps to start the interpretation and data analysis (Yin, 2003). Data are collected through conducting one-on-one interviews. Once all interviews are conducted and notes are taken and answers are transcribed, the stage of data analysis began.

A typed hard copy of interview answers were prepared and revised for accuracy. After revising the transcribed interviews, the coding stage began. The data coding was developed based on hypothetical and academic intent to help build a well-defined case study format. This substantive coding basically is divided into three parts of data, and these three parts are used to create a meaningful and connected manuscript. The three parts of data coding are:

- Preparedness (internal). This part of data coding represents the data that relate to the hospital internal preparedness such as the hospital's Incident Command System, logistics, the hospital's capabilities (healthcare, resources, supply management, and

utilities). In other words, preparedness focuses on the management part within the hospital.

- Response (external). This coding of data reflects the data that relates to the hospital's external interaction during disasters, such as the way the hospital interacts with first responders in the region and the way the hospital responds to its community needs during disasters.

- Unsure. This part reflects the area of data where the answer may not be related to the question, or where there may be no answer.

3.7 Limitations

In general, a qualitative research that includes narrative inquiry requires the researcher to serve as an instrument for collecting the data. So, there are many factors in each research that may affect the quality of the research findings such as the researcher's experience, education, values, and beliefs (Yin, 2003). Moreover, it is possible that individuals who participated in this study may not interpret the interview questions correctly, may not have been participating positively, or may have expressed possible biases (Isaac & Michael).

For this research specifically, the research data were based on a limited number of individuals who participated in this study. Also, since this research focuses on the hospital's preparedness for dealing with emergency situations that could have a significant impact on the community, some of those participants may never be involved in a major disaster and therefore would be unable to tell what would happen in a real major disaster.

3.8 Summary

The methodology used a descriptive case comparison of the two hospital systems, two county emergency offices, and communities through utilization of interviews and document and emergency plan review. Gathered data was analyzed and coded into three parts—preparedness, response, and unsure. The limited number of participants and the lack of major disaster experience may have affected the study findings.

CHAPTER 4

COMPARISON BETWEEN AN URBAN AND A RURAL HOSPITAL

Comparison helps us to identify if there are any differences between hospitals. The following table compares the urban and rural hospitals in terms of their capabilities and geographical location (USNews, 2011) (Census, 2010):

Area of Comparison	A Rural Hospital	An Urban Hospital
Geographic Location	A Rural Area	An Urban Area
County Population\ Residents #	107,931	744,344
Number of Beds \ Year	113	528
Admissions \ Year	5,122	32,356
Emergency Room Visits \ Year	27,042	100,826
Outpatients Encounters \ Year	747,246	1,159,000
Medical & Dental Staff	215	1,500

Table 3: Comparison of capabilities

Comparing data collected from participants:

This part compares the data that were collected from participants through interviews. As shown in the following diagram, participants from both hospitals see the hospital's role, top priorites for improvment of interactions, and the suggestions for improvements almost the same. In the first category they both see the hospital's preparedenss around 63%, and around 35% for

the response part. Also, they both see the hospital's top priorities at 50% for prepardenss and 50% for response, whereas in the category of suggestion for improvements, both the urban and rural hospitals consider 100% as a preparedenss part.
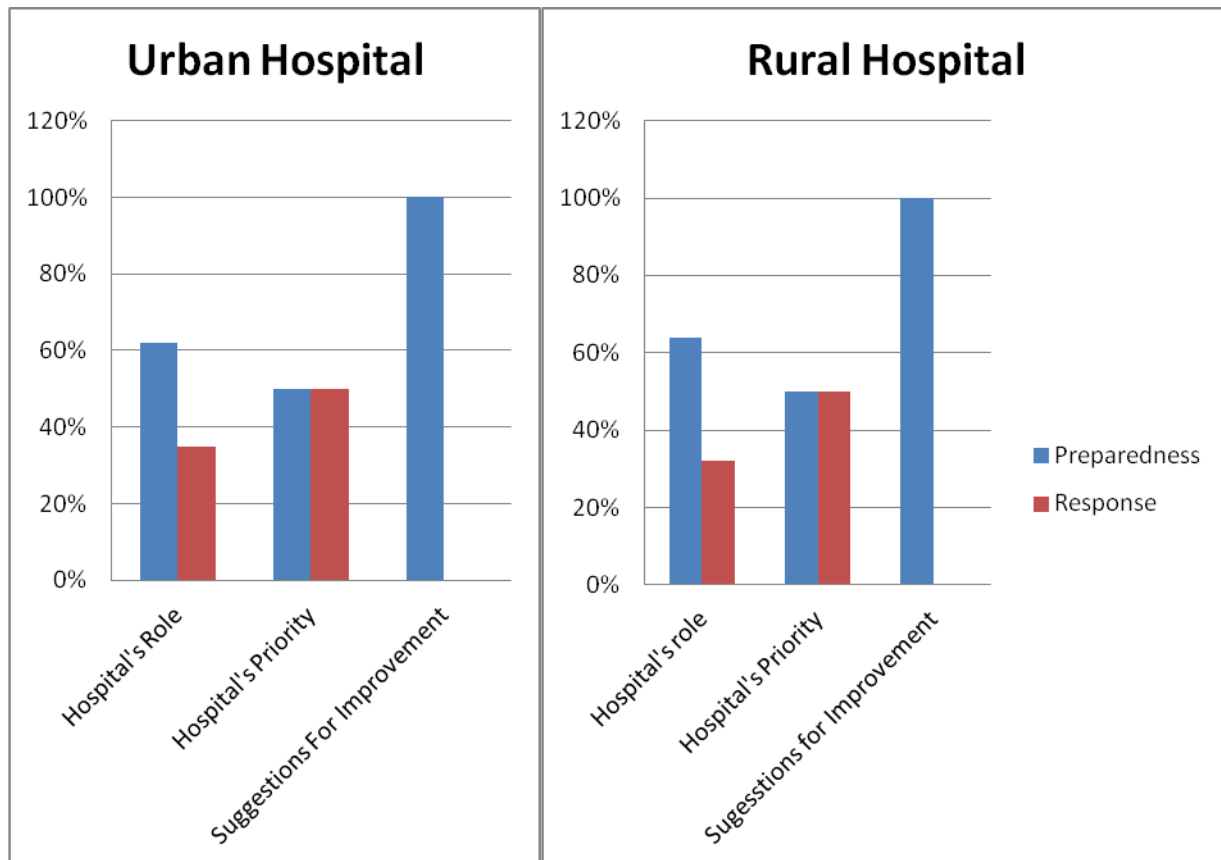
Figure 2: Comparison of data collected from interviews – Urban vs. Rural.

Comparison of hospitals' emergency plans:

This comparison is based on the emergency plans received from the urban and rural hospitals. Both hospitals have emergency plans to follow during disasters and emergency situations. The main managerial structures for both plans follow the incident command system structure, which was developed by the Federal Emergency Management Agency (FEMA). The ICS defines the responsibilities for the emergency committee and identifies the communications network and reporting channels. Moreover, these emergency plans should be in compliance with the JCAHO's requirements and standards and any other requirements for hospitals such as the NFPA and any state requirements. The following table compares the hospitals' emergency plans.

Yes: Means the hospital has mentioned that point in its emergency plan

No: No information found

Area of the Emergency Plan	Urban Hospital	Rural Hospital
A written Emergency/ Disaster Management Plan	Yes	Yes
Compliance with The Joint Commissions' Emergency Management (JCAHO)	Yes	Yes
Compliance with the States Department of Homeland Security National Incident Management System (NIMS)	Yes	Yes
Compliance with the National Fire Protection Association (NFPA)	Yes	Yes
Compliance with The Federal Emergency Management Act (FEMA)	Yes	Yes
The foundation of the plan is based on the Incident Command System (ICS) with defined responsibilities	Yes	Yes

and clear communication and reporting channels		
Clear Job Action Sheets for each of the possible positions	Yes	No
The hospital has an Emergency Management Team/ Committee	Yes	Yes
Hazard Vulnerability Analysis (HVA)	Yes	Yes
The Hospital Emergency Management Manual is accessible to all department	Yes	Yes
Training staff for emergency	Yes	No
Drills	Yes	Yes
Conducting a review of the plan by the Emergency Management Committee, at least once a year	Yes	Yes
Incident Facilities (locations may activated during the activation of the Emergency plan)	Yes	No
Emergency Management Response Flow Chart	Yes	No
Mutual aid Evacuation and Supply Plan Annex	Yes	No
Contingency resource supplies and equipment plan annex	Yes	No
Pandemic Influenza Plan Annex	Yes	No
Mass Fatality Plan Annex	Yes	No
Biological Incident Annex	Yes	No
Annex for Hospital Point of Dispensing (HPOD) Clinics	Yes	No
Hospital Evacuation Plan Annex	Yes	No
Alternate Triage Site Plan Annex	Yes	No
Disaster Surge Capacity site Chart, (utilized for housing of disaster event patients)	Yes	No

	Yes	No
Explosive Annex	Yes	No

Table 5: Comparison of the emergency plans

General comparison for both hospitals:

The following table shows a comparison between the urban and rural hospitals. It shows a general and wide comparison between the hospitals' systems and capabilities. For the most part this table is clear that the urban hospital has more capabilities and available resources. It can also interact easer with other hospitals in the area because of the availability of other hospitals in the same area and the short distance between hospitals, whereas the rural hospital is usually the only one in that area. This comparison was created based on reviewing the hospitals' emergency plans and the data collected from interviews.

Area of Comparison	Urban	Rural
Emergency Management Plans	Yes	Yes
Accredited by the Joint Commission (JCAHO)	Yes	Yes
ICS Structure - Role of Employees	More	Less
Resources (Specialists, staff, others)	More	Less
Equipment	More	Less
Power Generators	More	Less
Capacity (Number of Beds)	More	Less
Advanced Medical Centers (Trauma Center, Cardiac Center)	More	Less
Decontamination Facility	Fixed	Not-Fixed
Interaction with Hospitals in the Area	Easier / Near	Far

Table 6: General comparison for both hospitals

Summary:

This chapter shows some comparisons between the urban and rural hospitals in terms of the hospitals' capabilities, emergency plans, and participants' feedback from interviews. The capabilities and resources of the urban hospital are greater than the rural hospital. The urban hospital has more beds, more medical specialists and employees, and more advanced medical units and equipment. In addition, its geographical location helps the urban hospital interact and cooperate more easily and faster with other short-distance hospitals in the same area, whereas the rural hospital is the only one in its area.

In terms of the hospitals' emergency management systems and plans, both hospitals are in compliance with the JCAHO requirements and other standards. The emergency plans for the hospitals are based on the Incident Command System (ICS) structure with defined responsibilities and clear communication and reporting channels. However, in the rural hospital an employee may play many roles in the ICS, whereas in the urban hospital usually one employee plays one role. Also, even though both hospitals have emergency plans, the urban hospital has a more detailed plan.

Participants from both hospitals view the hospitals' top priority during a regional disaster as improvment of interactions and the suggestions for improvements almost the same. Chapter five includes more data based on the participants' feedback and how they view the hospitals' preparedness and response during disasters.

CHAPTER 5

STUDY FINDINGS

The coded data were divided into three categories based on the questions that were used during the interviews, as each group of questions was created to gather specific information. Splitting the data into three categories was an important step, as it helps us understand the outcomes of the coded data. Each group of interview questions focuses on a specific area of the hospital's emergency system. The first category was to identify the hospital's role within a regional disaster response. It shows the role hospitals play in preparing and responding to disasters. This category is based on the data gathered from the following questions:

1. What are your thoughts about the hospital's role within a regional disaster response?
2. What are your thoughts about how related emergency responders and the local community view the hospital's role within a regional disaster response?
3. What are your thoughts about the hospital's readiness to assist with the community's response to a regional disaster?
4. Who is your liaison within the local Incident Command System?
5. What are your thoughts about the capabilities of the hospital to interact with other hospitals, healthcare institutions, and disaster response organizations during a regional disaster response?

The second category identifies the hospital's top priorities for interaction during and after disasters. It focuses on gathering data that can identify the most important areas for the hospitals

to improve preparation, responsiveness, and interaction to the community. The data for this category is based on the collected data from the following questions:

6. What do you think are the top priorities that enable the hospital to improve these interactions during a regional disaster response?

7. What do you think is the hospital's role in contributing to the community's recovery after a regional disaster?

The third category identifies any suggestions for improvements that participants would like to see in the hospital. This part was based on the following questions:

8. Do you have any suggestions for improving the internal/external interactions during a regional disaster response?

9. Do you have any suggestions for improving the hospital's capabilities for responding to the region's recovery/resiliency after a regional disaster?

The following subchapters 5.1, 5.2, and 5.3 show the study findings for the urban hospital, the rural hospital, and the external parties.

5.1 The Urban Hospital

The following tables show the data coding findings for the urban hospital as well as the statistical findings for these data. The statistical table shows the number of preparedness and response coding we received for each question. Then we converted these numbers into percentages to help us understand the final results. The samples in the following tables mean:

A#: Answer   Q#: Question number   P: Preparedness   R: Response   N: Unsure

		A1	A2	A3	A4	A5	A6	A7	A8	A9
Q1	Role in regional disaster response	P	R	R	R	P	R	R	P	P
Q2	Cognition of hospital's role from externals	R	R	P	N	R	R	P	R	P
Q3	Hospital's readiness to assist with the community	P	P	P	P	P	P	P	P	P
Q4	Liaison / ICS	P	P	P	P	P	P	P	P	P
Q5	Hospital's capacities to interact with externals	R	R	P	R	R	R	R	P	P
Q6	Top priorities to enable interactions	R	P	P	P	P	P	P	P	P
Q7	Roles in community recovery	P	R	R	R	R	R	R	R	N
Q8	Suggestion for improvement of interaction	P	P	P	P	P	N	N	P	P
Q9	Suggestion for improvement of hospital in regional recovery	P	P	P	P	P	N	P	P	N
Q10	Critical Infrastructure	R	N	R	P	N	N	N	N	R
Q11	Rural VS Urban	P	P	R	R	P	P	P	R	P

Table 7: Data coding for the urban hospital

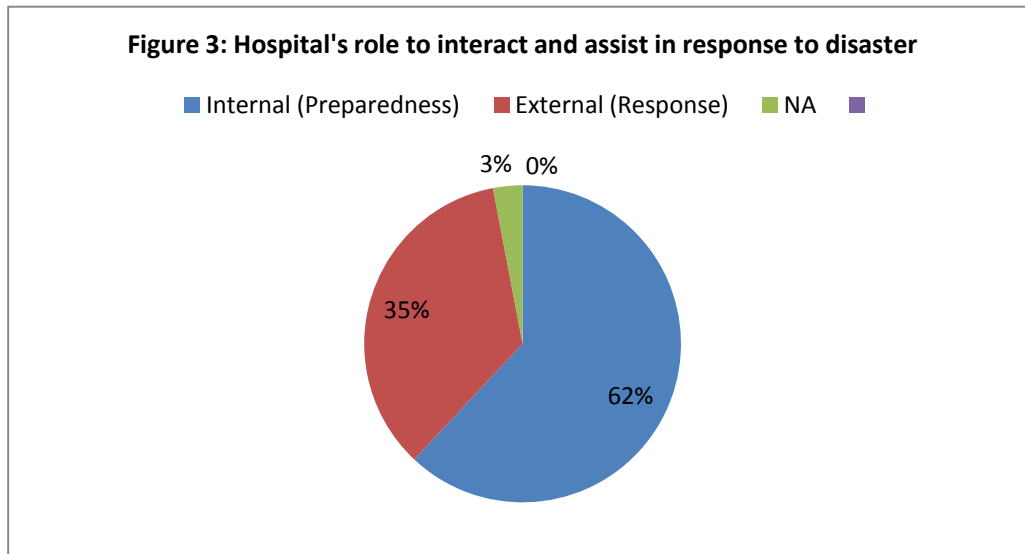|	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
P	4	3	9	9	3	8	1	7	7	1	6
R	5	5	N	N	6	1	8	N	N	3	3
Unsure	N	1	N	N	N	N	N	2	2	5	N
Sum	9	9	9	9	9	9	9	9	9	9	9

Table 8: Statistical data for the urban hospital

First category: The hospital's role within a regional disaster response

This category reflects the role of the hospital to prepare, interact, and respond to the community. It identifies the level of preparedness of the hospital management system. It also shows the hospital's role interacting with the community, other hospitals, and external responders. The data for this part were collected from the following questions:

- What are your thoughts about the hospital's role within a regional disaster response?

- What are your thoughts about how related emergency responders and the local community view the hospital's role within a regional disaster response?

- What are your thoughts about the hospital's readiness to assist with the community's response to a regional disaster?

- Who is your liaison within the local Incident Command System?

- What are your thoughts about the capabilities of the hospital to interact with other hospitals, healthcare institutions, and disaster response organizations during a regional disaster response?

The following diagram shows the participants' responses by percentage:

Figure 3: Hospital's role to interact and assist in response to disaster

■ Internal (Preparedness) ■ External (Response) ■ NA ■

3% 0%

35%

62%

In this diagram, 62% of participants see the hospital's role as a part of the hospital's preparedness (internally) through:

- Be prepared and involved in every disaster that could occur in the region - 9 responses

- Do the hospital's mandatory drills and other drills to maintain preparedness - 2 responses

- Work collaboratively with first responders through meetings and drills – 2 responses

- Get feedback from drills and small disasters and learn and improve on that – 3 responses

- Be prepared to provide healthcare, treatment, safe place, and triage – 4 responses

- Hospital is a source of information during disaster because of the hospital's specialists and expertise – 1 response

- Understand the ICS plans, structure, and roles – 2 responses

- Have the right communications network at all levels internal and external to the hospital – 1 response

Also, 35% of participants see the hospital's readiness and role to interact and assist with the community's response to a regional disaster as part of the hospital's response role through:

- Responding to people during disaster such as providing treatment, safe place, and other needs - 5 responses

- Working and interacting with external responders as a team during a disaster and sharing the important information – 4 responses

- Educating the community and providing that type of information they need – 1 response

- Working and communicating collaboratively with other hospitals to check on available beds and other resources so they share the information when a hospital needs to evacuate or transfer patients from/to hospitals – 4 responses

Second category: the hospital's top priorities for improving interaction within the community

The data gathered for this category identifies the top priorities of the hospital's emergency system that need improvement. Participants suggested some improvements for the internal and external role of the hospital. The collected data for this category focuses on improving the hospital interaction and contributing to community needs during and after the disaster. The following questions were used for this category:

- The top priorities the enable the hospital to improve these interactions during a regional disaster response?

- The hospital's role in contributing to the community's recovery after a regional disaster?

These questions show the hospital's top priority for improvements (internally and externally) to be able to contribute and interact with the community. The results for both questions show a 50% internal role and a 50% external role, as shown in the following diagram:

Figure 4: Hospital's Top Priority for Improvement

- Internal (Preparedness)
- External (Response)

50%   50%
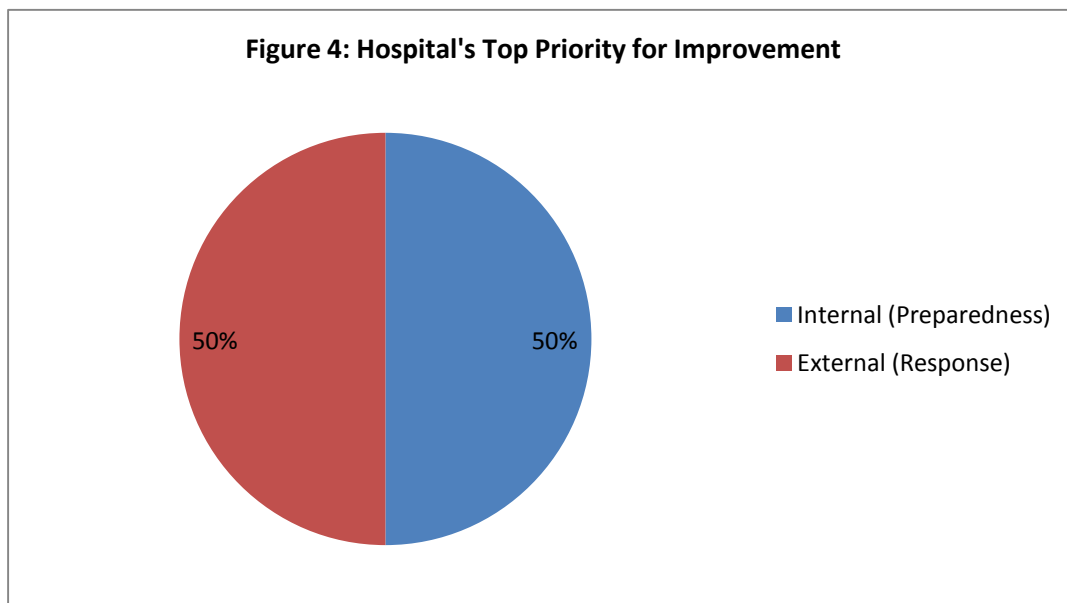
In this category 50% of responders feel that the hospital's top priority should be improving its preparedness through:

- Improving the communications with in/out, through having the right communication network and system – 5 responses

- Practicing and drills – 3 responses

- Debriefing after drills – 1 response

- Continuing healthcare as the first role – 1 response

- The hospital can receive and provide feedback on what improvement opportunities are possible – 1 response

However, 50% of responders feel that the hospital's top priority should be to contribute to the community's recovery through improving the external (response) role by:

- Providing safe place, food, and water for people – 2 responses

- Providing treatment healthcare – 4 responses

- Providing child care, elder care, nursing, and physician support – 1 response

- Working with external responders – 1 response

- Improving the direct involvement with first responders in the field – 1 response

Third category: Open suggestions for improvement

The third category of the data shows suggestions for improvement. The questions used for this category focus on gathering data that participants would think of as an area of improvement of the hospital's role within a regional disaster. The collected data are based on the following questions:

- Do you have suggestion for improving the internal/external interactions during a regional disaster response?

- Do you have suggestions for improving the hospital's capabilities for responding to the region's recovery/resiliency after a regional disaster?

In this category, participants' suggestions for improving the hospital's interactions during a disaster and capabilities for regional recovery were 100% supporting improvement of hospital preparedness through:

- Improving communications through having better and more common links of communication, using clear language, decreasing the crowd, noise, and redundancy in the

communication center, using new technology and communication systems (such as live

TV, mass text program) – 7 responses

- Better utilization of a true incident command structure – 1 response

- Training in exercises and drills and participating regularly – 2 responses

- Improving resources, especially people resources (e.g., involving physicians and nurses

  who have retired and are not in the workforce anymore in community response) – 2

  responses

- Having a regional supply that serves the hospitals in the area and the community – 1

  response

- Meeting with all players and working collaboratively – 1 response

This diagram shows the percentage of participants for suggestions:
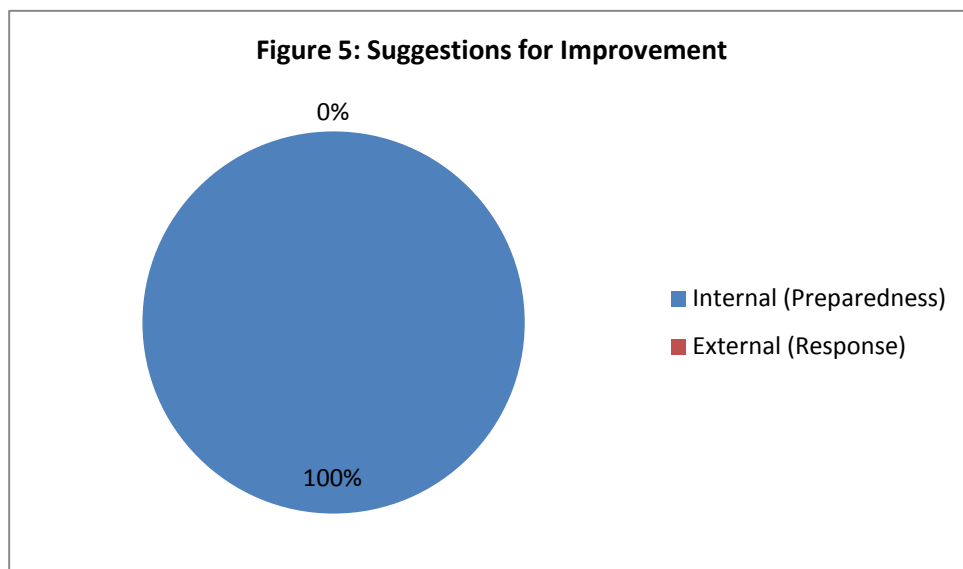
Figure 5: Suggestions for Improvement

0%

100%

- Internal (Preparedness)
- External (Response)

Urban vs. Rural:

The following question was used to compare and identify some differences between the urban and rural hospitals. The data gathered from this question helps us to compare how hospitals see themselves and others.

- Do you think that there is a difference in the regional disaster response roles for the rural hospital vs. the urban hospital?

In this question, participants see the differences between the rural hospital and the urban hospital in the regional disaster response with 66% as part of the hospital's internal preparedness, and 34% as part of the hospital's external interaction and response. Here are some of the main points regarding the differences:

Figure 6: Differences - Urban vs Rural Hospital
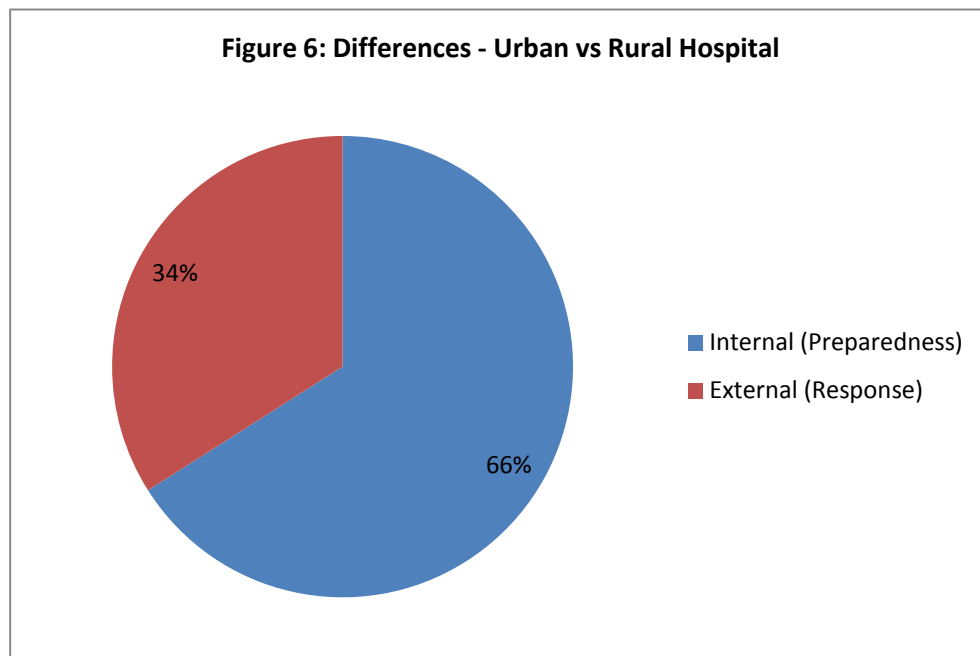
Summary of differences:

Internal preparedness:

- Regardless of size, both hospitals are required to comply with NYS and some federal requirements, such as NIMS and JC requirements. They both are required to have a certain level of preparedness – 1 response

- Urban hospitals may be more self-sufficient to last longer, whereas a rural hospital, if it had some kind of internal emergency, may be looking at having to evacuate earlier than an urban hospital – 1 response

- The urban hospital has a fixed decontamination facility, whereas a rural hospital may have a tent that they have to set up outdoors – 1 response

- The preparedness equipment such as power generators is going to be greater in an urban hospital than in a rural hospital, - 2 responses

- There is a difference in the hospital incident command system layout. An urban hospital might have a hospital that has 70 employees. In a rural hospital one person might have multiple roles – 2 responses

- There is a difference in the number of people who are going to be affected in the hospital – 1 response

- An urban hospital has more available resources than a rural hospital – 3 responses

External response:

- Interaction with other hospitals: an urban hospital is one member of other hospitals in the area, so there can be shared responsibilities among them, whereas a rural hospital mostly will be the only one in that area - 2 responses

- Urban hospitals in an urban area have more resources and infrastructure than in a rural area – 1 response

- An urban hospital can respond and absorb more patients because of its larger number of beds and resources – 1 response

5.2 The Rural Hospital

The following tables show the data coding findings for the rural hospital and the statistical findings for these data. The statistical table shows the number of preparedness and response coding we received for each question. Then we converted these numbers into percentages to help us understand the final results. The samples in the following tables mean:

A#: Answer   Q#: Question number   P: Preparedness   R: Response   N: Unsure

		A1	A2	A3	A4	A5
Q1	Role in regional disaster response	R	R	R	P	P
Q2	Cognition of hospital's role from externals	P	R	R	P	P
Q3	Hospital's readiness to assist with the community	P	P	P	P	P
Q4	Liaison / ICS	P	P	P	P	N
Q5	Hospital's capacities to interact with externals	R	R	R	P	P
Q6	Top priorities to enable interactions	P	P	P	P	P
Q7	Roles in community recovery	R	R	R	R	R
Q8	Suggestion for improvement of interaction	P	P	P	P	P
Q9	Suggestion for improvement of hospital in regional recovery	P	P	P	P	P
Q10	Critical Infrastructure	P	R	R	P	R
Q11	Rural VS Urban	P	P	P	R	R

Table 9: Data coding for the rural hospital

|	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
P	2	3	5	4	2	5	N	5	5	2	3
R	3	2	N	N	3	N	5	N	N	3	2
Unsure	N	N	N	1	N	N	N	N	N	N	N
Sum	5	5	5	5	5	5	5	5	5	5	5

Table 10: Statistical data for the rural hospital

First category: The hospital's role within a regional disaster response

This category reflects the role of the hospital to prepare, interact, and respond to the community. It identifies the level of preparedness of the hospital management system. It also shows the hospital's role interacting with the community, other hospitals, and external responders. The data for this part was collected from the following questions:

- What are your thoughts about the hospital's role within a regional disaster response?

- What are your thoughts about how related emergency responders and the local community view the hospital's role within a regional disaster response?

- What are your thoughts about the hospital's readiness to assist with the community's response to a regional disaster?

- Who is your liaison within the local Incident Command System?

- What are your thoughts about the capabilities of the hospital to interact with other hospitals, healthcare institutions, and disaster response organizations during a regional disaster response?

Sixty-four (64%) of participants from the rural hospital see the hospital's role as mainly part of the hospital's internal preparedness, whereas 32% of participants consider it part of the hospital's response and external interaction. The following diagram shows participants' responses by percentage:

Figure 7: Hospital's role to interact and assist in response to disaster
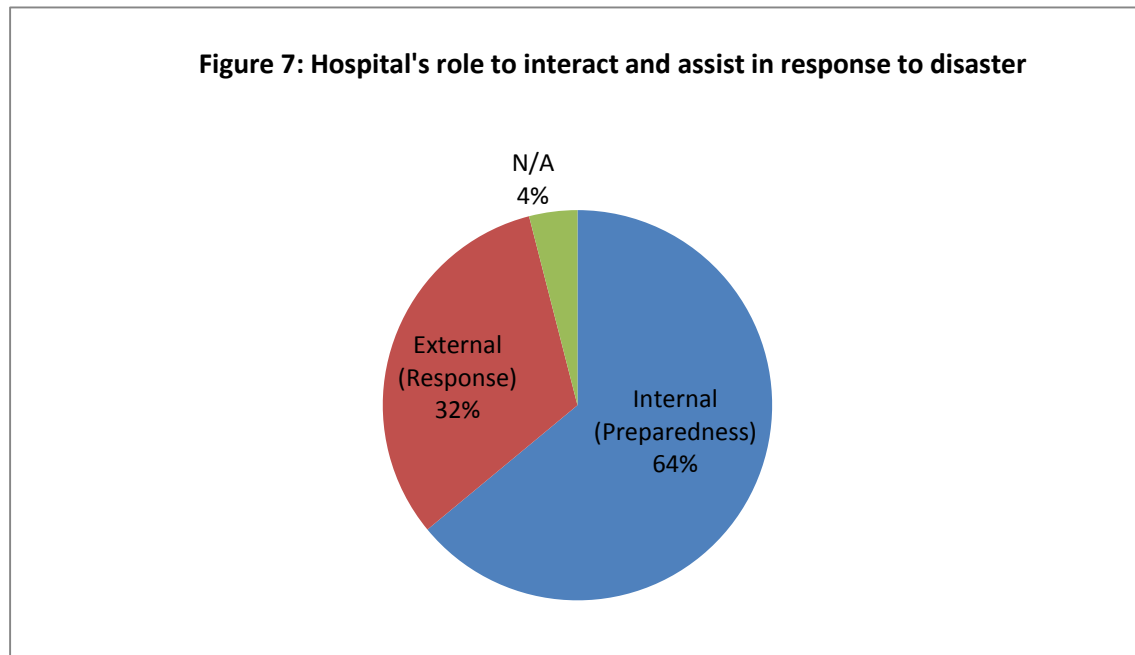
Participants see the hospital's internal preparedness through:

- Continuing to prepare and plan - 2 responses

- Providing healthcare, treatment, and shelter – 1 response

- Having enough resources and supplies, e.g., food, medications, and other needs – 2 responses

- Working collaboratively with external responders through practicing, drills, and planning – 3 responses

- Drills and practicing – 2 responses

- Effective communication with in/out the hospital – 1 response

Also, those participants consider the hospital's role in response to community as an external (response) role through:

- Responding to the community during disasters by admitting and treating patients – 2 responses
- Interacting and communicating with other hospitals in the region, whether by sending or accepting patients – 3 responses
- Working with emergency responders as a team during disasters to share responsibilities – 1 response
- Provide support services to the community – 1 response

Second category: the hospital's top priorities for improving interaction within the community

The data gathered for this category identifies the top priorities of the hospital's emergency system that need improvement. Participants suggested some improvements for the internal and external role of the hospital. The collected data for this category focuses on improving the hospital interaction and contributing to community needs during and after the disaster. The following questions were used for this category:

- The top priorities the enable the hospital to improve these interactions during a regional disaster response?
- The hospital's role in contributing to the community's recovery after a regional disaster?

These questions show areas that the hospital needs to improve (internally and externally) to be able to contribute and interact with the community. The participants see the hospital's role as 50% internal and 50% external.

Figure 8: Hospital's Top Priority for Improvment- A rural hospital
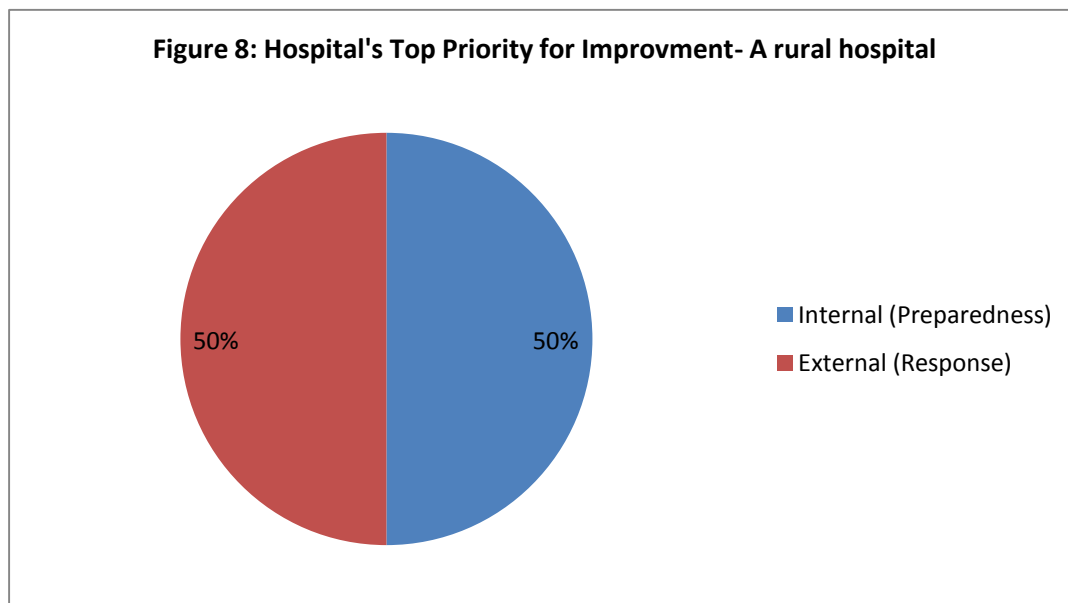
The participants of a rural hospital consider the hospital's preparedness as the area where the hospital can improve its interactions during a regional disaster response. Here are some of the main considerations for improvements:

- Making sure the hospital has skilled and sufficient staff – 1 response

- Conducting more drills and practices – 2 responses

- Having backup to the backup – 1 response

- Improving communications links and systems – 2 responses

- Improving the interaction and preparation with emergency responders – 1 response

- Identifying responsibilities – 2 responses

In contrast, participants consider the role of the hospital to contribute to the community's recovery as mainly an external response role:

- Working collaboratively and sharing responsibilities with other emergency responders – 1 response

- Providing healthcare, safe place, and other needs for the community – 2 responses

- Educating people in the community on what to do and how to protect themselves during and after disasters – 1 response

- Maintaining and recovering the hospital internally so it can continue providing services

- Hospital and emergency responders need to be able to identify shortages that still exist and need attention – 1 response

Third category: Open suggestions for improvement

The third category of the data shows suggestions for improvement. The questions used for this category focus on gathering data that participants would think of as an area of improvement the hospital's role within a regional disaster. The collected data are based on the following questions:

- Do you have suggestion for improving the internal/external interactions during a regional disaster response?

- Do you have suggestions for improving the hospital's capabilities for responding to the region's recovery/resiliency after a regional disaster?

In this category, participants' suggestions for improving the hospital's interactions during a disaster and capabilities for regional recovery were 100% supporting improvement of the hospital preparedness through:

- More practicing and drills including internal and external responders – 3 responses

- Doing more debriefing after drills – 1 response

- Training employees on the ICS and identifying their roles – 1 response

- Improving communications, e.g., using visual, auditory, and mass texting – 3 responses

- Taking care of employees and caregivers so they can be productive since they would be stressed – 3 responses

- Financial funding to help the hospital to continue developing its preparedness – 1 response
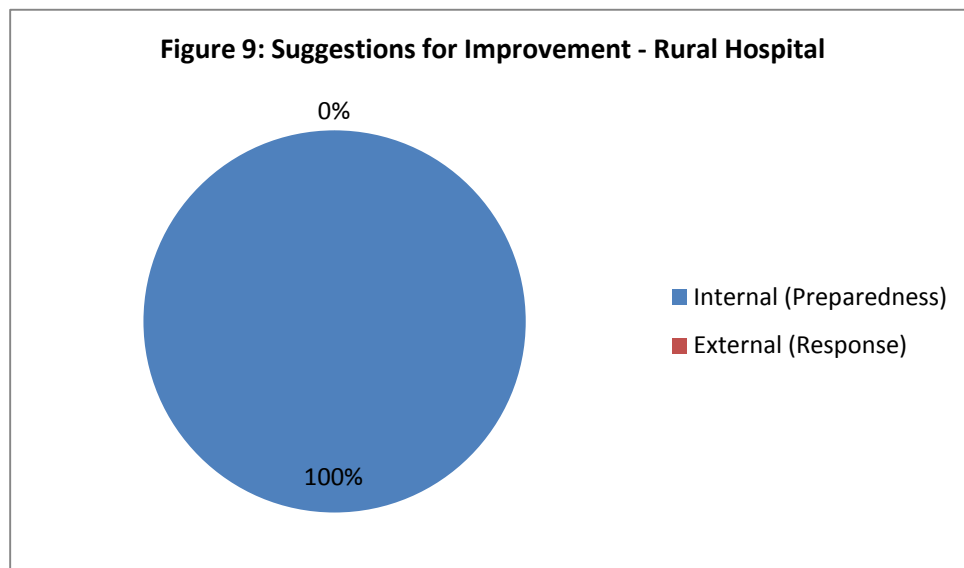

Figure 9: Suggestions for Improvement - Rural Hospital

Urban vs. Rural:

The following question was used to compare and identify some differences between the urban and rural hospitals. The data gathered from this question helps us to compare how hospitals see themselves.

- Do you think that there is a difference in the regional disaster response roles for the rural hospital vs. the urban hospital?

Participants in the rural hospital see the differences between the rural hospital and the urban hospital in the regional disaster response as 60% for the hospital's internal preparedness, and 40% for the hospital's external interaction and response.

Figure 10: A Rural Hospital Vs. an Urban Hospital
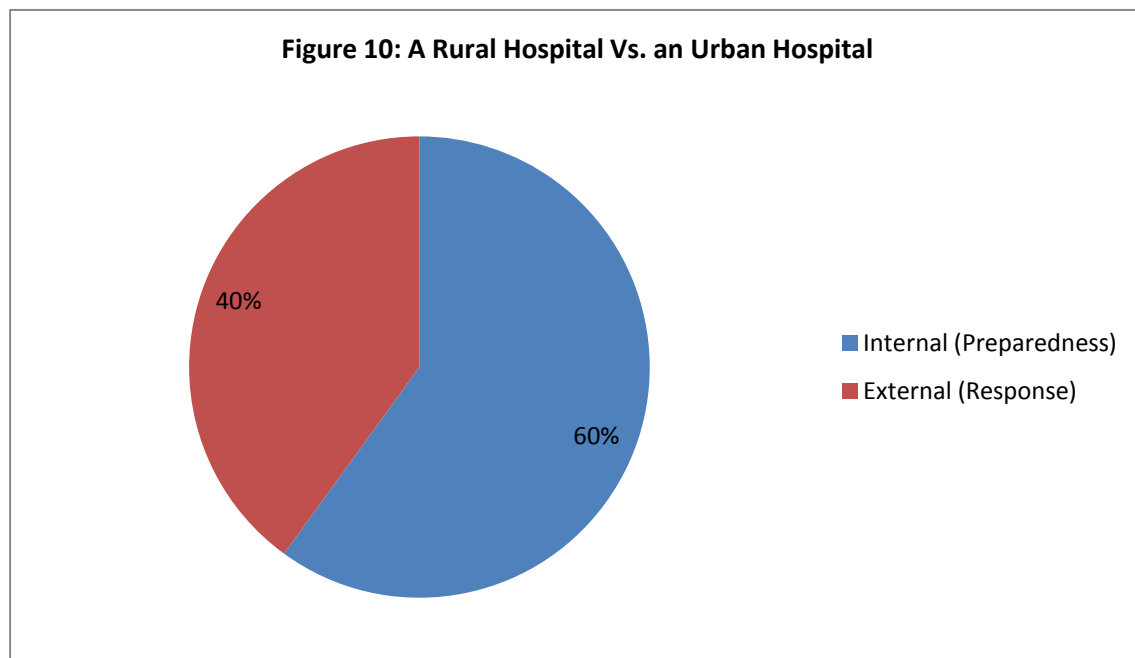
Summary of differences:

Internal preparedness:

- The rural hospital has fewer resources compared to an urban hospital, so the smaller scale is going to effect the rural hospital - 3 responses
- The rural hospital does not have the ability to deal with trauma cases, whereas an urban hospital does – 2 responses
- They are the same regarding the size since they are going to have the same proportion of people based on the size of their communities – 1 response

External response:

- An urban hospital has many close hospitals in the same region and can work with each other, whereas a rural hospital is usually the only one in that area – 1 response
- Because of the geographic area, some people in the rural area further from the hospital, whereas in an urban area they live closer to the hospitals – 1 response

5.3 External Parties

The following tables show the data coding findings for the external parties and the statistical findings for these data. The statistical table shows the number of preparedness and response coding we received for each question. Then we converted these numbers into percentages to help us understand the final results. The samples in the following tables mean:

A#: Answer   Q#: Question number   P: Preparedness   R: Response   N: Unsure

		A1	A2
Q1	Role in regional disaster response	R	R
Q2	Cognition of hospital's role from externals	P	R
Q3	Hospital's readiness to assist with the community	P	P
Q4	Liaison / ICS	P	P
Q5	Hospital's capacities to interact with externals	P	P
Q6	Top priorities to enable interactions	P	P
Q7	Roles in community recovery	R	R
Q8	Suggestion for improvement of interaction	P	R
Q9	Suggestion for improvement of hospital in regional recovery	P	P
Q10	Critical Infrastructure	R	R
Q11	Rural VS Urban	R	P

Table 11: Data coding for external parties

|	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
P	N	1	2	2	2	2	N	1	2	N	1
R	2	1	N	N	N	N	2	1	N	2	1
Unsure	N	N	N	N	N	N	N	N	N	N	N
Sum	2	2	2	2	2	2	2	2	2	2	2

Table 12: Statistical data for external parties

First category: The hospital's role within a regional disaster response

This category reflects the role of the hospital to prepare, interact, and respond to the community. It identifies the level of preparedness of the hospital management system. It also shows the hospital's role interacting with the community, other hospitals, and external responders. The data for this part were collected from the following questions:

- What are your thoughts about the hospital's role within a regional disaster response?

- What are your thoughts about how related emergency responders and the local community view the hospital's role within a regional disaster response?

- What are your thoughts about the hospital's readiness to assist with the community's response to a regional disaster?

- Who is your liaison within the local Incident Command System?

- What are your thoughts about the capabilities of the hospital to interact with other hospitals, healthcare institutions, and disaster response organizations during a regional disaster response?

These questions reflect the hospital's readiness and role to interact and assist with the community's response to a regional disaster. The participants of the external parties (e.g., The County Emergency Office and Health Office) see the hospitals role as 70% internal preparedness and 30% as the hospital's external response and interaction to the community.

Figure 11: Hospital's role to interact and assist in response to disaster- External parties
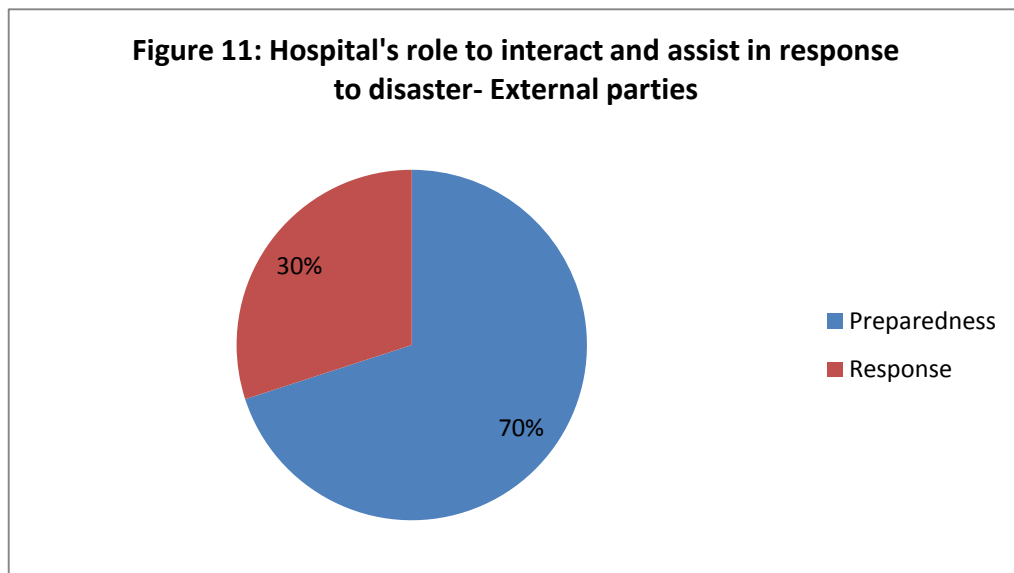
The participants see the hospital's internal preparedness through:

- Providing healthcare for the community – 1 response

- Working and communicating with other hospitals and emergency responders through meetings and planning – 1 response

- Conducting regular drills – 1 response

- Training and exercising – 1 response

- Having an effective communication with in/out the hospitals – 1 response

The participants from the external parties see the hospital's external role to respond to the community through:
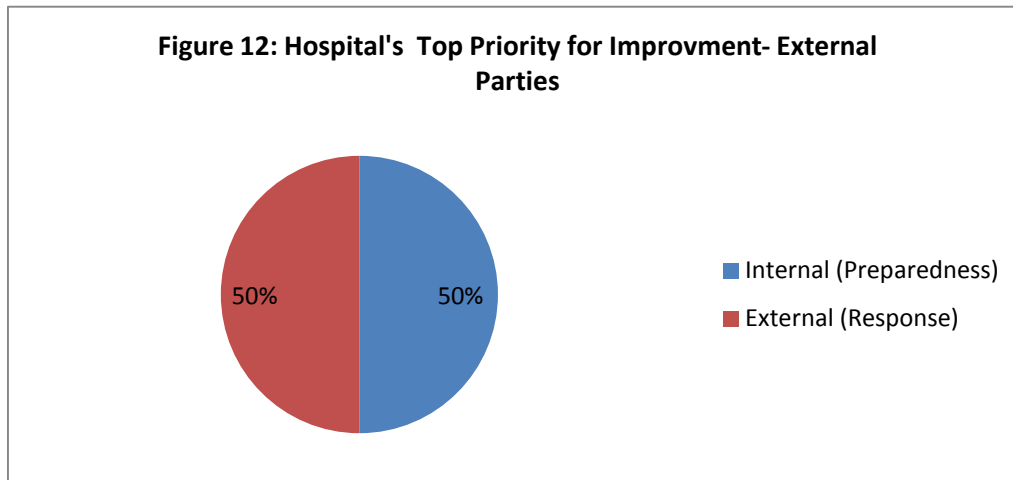
- Interacting and coordinating with external emergency responders during disasters to admit and treat patients – 1 response
- Responding to the community's needs during disasters such as healthcare, shelter, and food – 1 response

Second category: the hospital's top priorities for improving interaction within the community

The data gathered for this category identifies the top priorities of the hospital's emergency system that need improvement. Participants suggested some improvements for the internal and external role of the hospital. The collected data for this category focuses on improving the hospital interaction and contributing to community needs during and after the disaster. The following questions were used for this category:

- The top priorities the enable the hospital to improve these interactions during a regional disaster response?
- The hospital's role in contributing to the community's recovery after a regional disaster?

These questions show the hospital needs to improve (internally and externally) to be able to contribute and interact with the community. Participants see the hospital's role as 50% internal and 50% external.

Figure 12: Hospital's Top Priority for Improvment- External Parties

50%   50%

■ Internal (Preparedness)
■ External (Response)

The participants of the external emergency responders consider the hospital's preparedness as the area where the hospital can improve its interactions during a regional disaster response. These are some areas for possible improvements:

- Improving communications with all key players through the use of clear terminology through communication – 1 response

- Understanding the ICS – 2 responses

- Training on the National Incident Management System (NIMS) – 1 response

- Training and drills – 1 response

However, participants consider an external role where hospitals can make some improvements such as:

- Responding more effectively to disasters – 1 response

- Interacting with other hospitals to transfer and accept patients when needed – 1 response

- Providing some social work to the patients such as helping family members to get together after disasters – 1 response

- Providing physiological and mental support to community members after disasters – 1 response

- Communication before, during, and after a disaster – 1 response

Third category: Open suggestions for improvement

The third category of the data shows suggestions for improvement. The questions used for this category focus on gathering data that participants would think of as an area of improvement of the hospital's role within a regional disaster. The collected data are based on the following questions:

- Do you have suggestion for improving the internal/external interactions during a regional disaster response?

- Do you have suggestions for improving the hospital's capabilities for responding to the region's recovery/resiliency after a regional disaster?

In this category, participants' suggestions for improving hospital's interactions during a disaster and the capabilities for regional recovery are 75% for improving hospital preparedness and capabilities, and 25% for improving external involvements.

Figure 13: Suggestions for Improvements - External Parties

- Internal (Preparedness)
- External (Response)

25%

75%
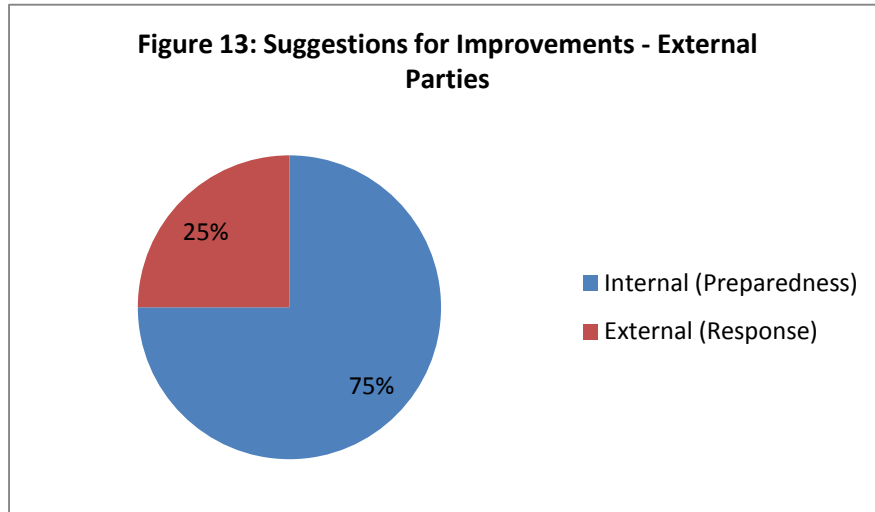
Suggestion for internal preparedness:

- Improve the communications systems and links – 2 responses

- Continue training and exercising with all responders – 2 responses

- Learn from other's experiences in the same area and in other areas of the country – 1 response

Suggestions for the response and external involvement with other responders:

- Improve the interaction with other emergency responders and the community – 1 response

Urban vs. Rural:

The following question was used to compare and identify some differences between the urban and rural hospitals. The data gathered from this question helps us compare how hospitals see themselves.

- Do you think that there is a difference in the regional disaster response roles for the rural hospital vs. the urban hospital?

Participants from external parties to the hospital see the differences between the rural hospital and the urban hospital in the regional disaster response as 50% for the hospital's internal preparedness, and 50% for the hospital's external interaction and response.

Figure 14: A Rural Hospital Vs. an Urban Hospital - External Parties Response
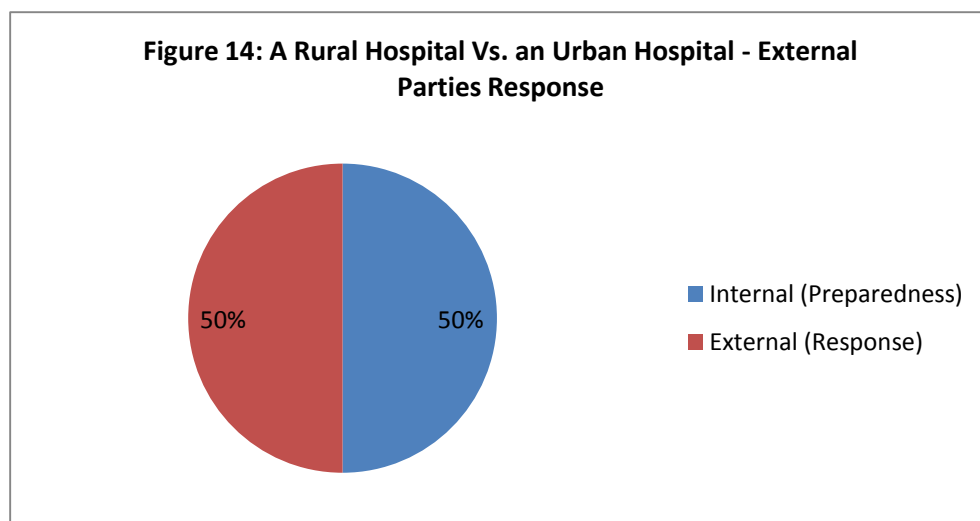
Summary of differences:

Internal preparedness:

- An urban hospital has more resources, capacity, and specialists, whereas a rural hospital has fewer resources and capabilities – 2 responses

External response:

- An urban hospital sees more patients than a rural hospital because of the population

    density – 1 response

CHAPTER 6

CONCLUSION AND RECOMMEDATIONS

6.1 Conclusion

The hospital's role in a regional disaster response is very important. The community depends on the hospital as a main component of its community infrastructure. Disasters can happen anytime and anywhere, so hospitals need to be ready to deal with them in an effective way. However, after the completion of this case study, a review of the literature, and a review of the hospitals' emergency plans, the research results show the following conclusions:

The number of disasters has increased in the last 20 years. Disasters may happen at any time with no previous warning and have various forms, some are natural sources and others are manmade. Disasters cause huge challenges for people and organizations on all levels and fields because disasters can destroy the infrastructures for cities, communities, and organizations. They can happen from various causes such as a hurricane, flood, earthquake, tsunami, power outage, tornado, or terrorist attack. Organizations must understand the nature and definition of a disaster, in terms for them to be able to respond to it.

Hospitals need to be able to continue providing services for people during disasters. Based on the lessons learned from previous disasters around the world, a large number of people are expected to be killed or injured. That means hospitals will need to provide services for more patients comparing to a usual day. Hospitals should have a Hospital Disaster Committee that is

responsible for the preparedness and planning, reviewing and testing the plan with mock drills. This committee should ensure the effectiveness of backup power and water supplies after disasters. To help hospitals be able to achieve these goals, many governmental and non-governmental organizations have worked hard to provide hospitals with plans, standards, and systems to ensure that they are ready and have the best managerial tools for dealing with disasters.

Many organizations have created and developed management systems, standards, and guidelines to help hospitals to manage and improve their preparedness and response levels for disasters. JCAHO, FEMA, UNDP, OSHA and others play an effective role in improving the hospitals' standards and management systems. These organizations keep updating their standards as needed to improve the hospital's performance during and after disasters. Many standards help hospitals to plan and prepare for disasters, improve the emergency management structure, improve the hospitals' surge capacity, and improve communication networks and training. In addition, there are standards for reviewing and evaluating the implemented standards. Even though many standards cover different areas of the emergency system, they all complete each other in terms of improving the hospitals' management systems and guarantee the best outcomes of the hospital's services.

This work was conducted on two hospitals in Rochester, NY, one urban and one rural hospital. The methodology is a descriptive case comparison of the two hospital's systems, two county emergency offices, and is analyzed and coded into three parts—preparedness, response, and unsure. The coded data is divided into three categories based on the questions used for better understanding and comparison of the hospitals' roles and level of preparedness in response to

disasters. The limited number of participants and the lack of major disaster experience may have affected the study findings.

Overall, the study findings for the participants' responses for interviews questions from the urban hospital, the rural hospital, and external parties show almost similar percentages for the level of preparedness and response. These percentages reflect the similar way that participants see the hospitals' role within a regional disaster response, the top priorities for hospitals to improve interaction with the community during and after disasters, and the open suggestions that participants would like to see in hospitals. The following table shows a comparison of participants' responses:

	Preparedness			Response		
	Urban	Rural	E. Parties	Urban	Rural	E. Parties
Hospital's Role	64%	62%	70%	32%	35%	30%
Top Priorities	50%	50%	50%	50%	50%	50%
Suggestions for Improvement	100%	100%	75%	0%	0%	25%

Table 13: Comparison of the percentage of participants' responses

Participants from both hospitals see the hospital's role within a regional disaster response almost the same through planning, practices and drills, communication networks, resources, healthcare, and working with first responders. They see these areas as essential for hospitals to play an important role responding to the community during disasters. Moreover, participants considered the communications network, practices, and resources as the highest priorities for both hospitals to improve their interactions and roles in their communities.

The capabilities and resources of the urban hospital are greater than the rural hospital. The urban hospital has more beds, more medical specialists and employees, and advanced medical units and equipment. In addition, the geographical location for the urban hospital helps the hospital interact and cooperate easily and faster with other short-distance hospitals in the same area, whereas the rural hospital is the only one in its area.

The rural hospital is a determinant of the community's vulnerability and resiliency. However, the rural community is dependent upon the rural hospital for its ability to recover after disasters, as it may be the only place in the rural community where people will be able to get the services they need such as medical care, food, medications, and a safe place to stay. In contrast, people in the urban area have more than one hospital and other places that can provide the services they need. Also, the external parties have more concerns and expectations for the rural hospital's participation in the community's response and recovery.

In terms of the hospitals' emergency management systems, both the urban and the rural hospitals have emergency systems and plans. Both hospitals are in compliance with the JCAHO requirements and other standards. The emergency plans for the hospitals are based on the Incident Command System (ICS) structure with defined responsibilities and clear communication and reporting channels. However, in the rural hospital an employee may have many roles in the ICS, whereas in the urban hospital usually one employee has one role. In addition, even though both hospitals have emergency plans, the urban hospital's is more detailed.

All participants from the urban hospital, the rural hospital, and the external parties see the hospital as an essential part of the community's critical infrastructure and should be more involved in the community's response and recovery. Hospitals need to be more involved with

communities through improved interaction links, education, and training, as well as continuing the hospitals' main role of providing healthcare.

6.2 Recommendations for future study:

This study identifies the hospital's role in a regional disaster response. It also compares the level of preparedness between an urban hospital and a rural hospital in Rochester, NY. The following recommendations for future work are based on my engagement in this work:

- Rephrase some of the interview questions, especially 4 and 10, for better clarification and to allow for better feedback from participants.
- Conduct interviews with some of the community members to see how they view and understand the hospital's role during disasters.
- Include more participants in the study, especially members of the hospital's emergency team.
- Conduct more studies at other hospitals in the same area, and compare all the results for better evaluation of the hospitals' roles during a regional disaster.

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