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An evaluation of post-Katrina emergency preparedness strategies in hospitals on the U.S. Gulf of Mexico coastline

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AN EVALUATION OF
POST-KATRINA EMERGENCY PREPAREDNESS STRATEGIES
IN HOSPITALS ON THE U.S. GULF OF MEXICO COASTLINE

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Human Resource Education & Workforce Development

by

Holly Houk Cullen
B.A., Louisiana State University, 1983
M.B.A., Nicholls State University, 2000
December 2011

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DEDICATION

This study is dedicated to my husband and life partner, Ray Cullen. Ray means more to me than I ever could express in words, and my heart is full of gratitude for the sacrifices he made these past four years in enduring my many late nights, constant study and other school-related obligations. He calmed me when I was anxious and made me laugh at myself when I took things too seriously or feared failing. He built me up and encouraged me when I doubted my ability to keep going forward. His intellect, quick and clever humor—his warmth and steady, loving presence in all things makes my life a daily joy. Thank you for everything, Ray. After constantly saying that I was “getting there,” I finally did!

ACKNOWLEDGMENTS

I wish to acknowledge, first and foremost, my parents. My mother, who has inspired me with her incomparable work ethic, courage in facing life's challenges, her open heart, patience and strength, and the personal sacrifices she has made for her family throughout her life. I have learned, and continue to learn, by her example, and I greatly love, admire and respect her for providing me with the opportunities that have led to the completion of this dissertation. While my dad's light left us far too soon, he too was a wonderful role model. He taught me that I could do anything I put my mind to. He is in my thoughts and memories always, and I know how proud he would have been of this accomplishment.

I could not have earned this degree without the daily love and support of my husband, Ray. He has washed clothes, cleaned house, cooked dinner, bought groceries, boosted my confidence when I needed it most, and has been a sounding board for my ideas since I first mentioned my intention of going back to graduate school. He accepted my being away on nights and weekends to study, research and write, and has been my rock throughout this four-year journey. Through his encouragement, I was able to pursue and fulfill this personal dream. Rodeo.

I cannot thank Krisanna Machtmes enough for agreeing to serve as my Committee Chairperson and major professor. From the first class I took with Kris, I hoped she would agree to assist me in this critical capacity. I could not have been more excited when she said she would. Her expertise, enthusiasm and skill for mentoring and guiding students, coupled with her abundant sense of humor and generosity of spirit (and weekends!) all combined to motivate me to complete my program of study in a timely fashion. Kris ensured that I was given the freedom and wherewithal to passionately pursue a dissertation that would always be a source of personal

and professional pride. Not only has she given freely of her wisdom and resources, Kris also has given of her heart, and has become a trusted friend I will cherish for the rest of my life.

I wish to thank my dear friend and former colleague, MaryEllen Pratt, who from the very beginning offered advice, resources, and contacts, and has served as a member of my community of practice in developing this dissertation. MaryEllen's gift of time, knowledge and insight have contributed to making this dissertation the best it could be.

To my graduate faculty committee, Dr. Earl Johnson, Dr. Satish Verma, and Dr. Brian Wolshon, as well as my Dean's representative, Dr. Mary Kelley, you each have my enduring gratitude for your service, your constructive criticism and for challenging me to produce a rigorous, well-researched document of the highest quality.

I wish to acknowledge my family members, friends, classmates, research study participants, professional resources and particularly my LSU Communications & University Relations (CUR) colleagues, who have served as my support network these many months. Your understanding of my school-related responsibilities allowed me to stay on track and meet my deadlines in realizing this achievement.

Mary Leah, Susan, Robin, Craig, Betty, Jodi, Mary, Nurse Kim, Kim R., Alicia, Deirdre, Emily T., the Nortons and Brunsons, Mom, Scott, Chip, Larry, Sabrina, RCs, YaYas and many others—you have prayed for me, encouraged me and joined me in celebrating milestones along the way to seeing this goal through to its completion.

With love and gratitude to all of you for enabling me to achieve my dream.

Before closing, I would be remiss if I did not mention a little slip of paper given to me by my dear, late grandmother, Anna Belle Suchand, more than 30 years ago when I began my college days at LSU as an undergraduate. The paper, now attached to my refrigerator with a

magnet, is stained, worn and crumpled from years of use, but the prayer it holds has helped me to make it through just about every major test I have taken or presentation I have given since I received it. Here is the prayer:

O great St. Joseph Cupertino, who while on earth did obtain from God the favor of being asked in examinations the questions you knew. . . obtain for me a like favor in the exam for which I am now preparing. I will cause you to be known and loved, through Christ our Lord, Amen. St. Joseph Cupertino, pray for us.

My wish is that this prayer will help many others to succeed in their studies and examinations as it has helped me to do.

TABLE OF CONTENTS

DEDICATION	iii
ACKNOWLEDGMENTS	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
ABSTRACT.....	xi
CHAPTER 1. INTRODUCTION	1
Rationale	2
Why Hospital Preparedness is Important.....	5
Purpose Statement.....	6
Significance of the Study	6
Objectives of the Study	8
Research Question	9
Definitions of Terms	10
CHAPTER 2. REVIEW OF THE LITERATURE	18
Introduction.....	18
U.S. Legislation Related to Disaster Preparedness and Support	21
The Joint Commission	23
The National Response Framework and the National Incident Management System.....	25
Plans and Procedures	27
Training.....	28
Surge Capacity	30
Evacuation.....	31
Human Resources	35
Communication.....	36
Supplies and Pharmaceuticals.....	38
Fuel and Power	39
Medical Records	40
CHAPTER 3. METHOD	42
Qualitative Research Design.....	42
Phenomenological Approach to Data Collection and Analysis	44
Reliability and Validity.....	46
The Researcher's Lens	49
Population and Sample of the Study	51
Data Collection	53
Conceptual Framework.....	55
Interview Questions	56

Analyzing the Data	60
Limitations of the Study.....	62
CHAPTER 4. ORGANIZING, ANALYZING AND SYNTHESIZING DATA	63
Horizonalization.....	63
Identifying the Meaning Units	63
Meaning Units.....	65
Themes	173
Composite Thematic Textural-Structural Description.....	173
Hospital Emergency Preparedness.....	175
Policymakers and Planners	175
Plans, Policies and Procedures.....	178
Capital Investment (Facility Hardening)	181
Human Resources	182
Evaluation of Success	183
CHAPTER 5. SUMMARY, RECOMMENDATIONS AND CONCLUSIONS	185
Summary	185
Recommendation I.....	191
Recommendation II.....	196
Recommendation III	199
Recommendation IV	200
Recommendation V	203
Recommendation VI.....	206
Conclusions.....	207
REFERENCES	210
APPENDIX: LICENSE AGREEMENT WITH ELSEVIER	216
VITA.....	217

LIST OF TABLES

1.	Hospital characteristics	64
2.	Themes and descriptions of the lived experiences of the hospital respondents during and after Hurricanes Katrina, Rita, Gustav and Ike	173

LIST OF FIGURES

1.	Natural disasters reported	7
2.	Total number of people affected globally by all disaster types	7
3.	Composite Thematic Textural-Structural Description.....	174

ABSTRACT

Recent tragedies are causing hospitals to more intensively review their strategies and broaden their approach to emergency preparation. The Gulf Coast storms of 2005 and 2008 and other catastrophic events nationwide have illustrated the central role hospitals can and should play in a community's disaster recovery infrastructure.

Given the unpredictability of the world today, with the possibility of a mass casualty crisis constantly threatening, there is an urgent need to seek and achieve higher levels of readiness. If a hospital organization is not investing in emergency preparedness on a continuous basis, that facility and its community are placed at higher risk.

After bearing the brunt of several major, damaging storms for the past five years, hospitals along the coast in Louisiana, Mississippi and Texas have heightened their involvement in their own and their communities' recoveries, rebuilding their respective facilities and human resources so they can offer quality healthcare services to their communities.

This study sought to answer the following research question: What strategies are hospitals in coastal Louisiana, Mississippi and Texas using in their emergency preparedness plans five years since Hurricanes Katrina and Rita to facilitate their ability to respond more effectively under crisis conditions and to maintain critical patient care operations?

The researcher took an in-depth look at the many lessons learned by nine Gulf Coast region hospitals during their experiences with Hurricanes Katrina, Rita, Gustav and Ike by interviewing hospital administrators and emergency preparedness personnel. These interactions revealed strategies that the hospitals have implemented and what has yet to be done. Study participants provided an evaluation of their emergency policies and plans, practices and implementation as well as improvements, evacuation versus shelter-in-place strategies, training

and drills, supplies, reimbursement, communication and human resource issues. The study sought to identify trends and best practices being used by coastal healthcare facilities and to determine which of these have been put into practice. Finally, the study identified opportunities for future research in hospital emergency preparedness.

CHAPTER 1.

INTRODUCTION

URGENT – WEATHER MESSAGE
NATIONAL WEATHER SERVICE NEW ORLEANS LA
1011 AM CDT SUN AUG 28 2005

...DEVASTATING DAMAGE EXPECTED. ...
HURRICANE KATRINA. ...A MOST POWERFUL HURRICANE WITH
UNPRECEDENTED STRENGTH. ...RIVALING THE INTENSITY OF HURRICANE
CAMILLE OF 1969.
MOST OF THE AREA WILL BE UNINHABITABLE FOR WEEKS. ...PERHAPS
LONGER. AT LEAST ONE HALF OF WELL CONSTRUCTED HOMES WILL
HAVE ROOF AND WALL FAILURE. ALL GABLED ROOFS WILL FAIL. ...
...LEAVING THOSE HOMES SEVERELY DAMAGED OR DESTROYED.
THE MAJORITY OF INDUSTRIAL BUILDINGS WILL BECOME NON
FUNCTIONAL. PARTIAL TO COMPLETE WALL AND ROOF FAILURE IS
EXPECTED. ALL WOOD FRAMED LOW RISING APARTMENT BUILDINGS
WILL BE DESTROYED. CONCRETE BLOCK LOW RISE APARTMENTS WILL
SUSTAIN MAJOR DAMAGE. ...INCLUDING SOME WALL AND ROOF FAILURE.
HIGH RISE OFFICE AND APARTMENT BUILDINGS WILL SWAY
DANGEROUSLY. ...A FEW TO THE POINT OF TOTAL COLLAPSE. ALL
WINDOWS WILL BLOW OUT.
AIRBORNE DEBRIS WILL BE WIDESPREAD. ...AND MAY INCLUDE HEAVY
ITEMS SUCH AS HOUSEHOLD APPLIANCES AND EVEN LIGHT VEHICLES.
SPORT UTILITY VEHICLES AND LIGHT TRUCKS WILL BE MOVED. THE
BLOWN DEBRIS WILL CREATE ADDITIONAL DESTRUCTION. PERSONS. ...
...PETS. ...AND LIVESTOCK EXPOSED TO THE WINDS WILL FACE CERTAIN
DEATH IF STRUCK.
POWER OUTAGES WILL LAST FOR WEEKS. ...AS MOST POWER POLES WILL
BE DOWN AND TRANSFORMERS DESTROYED. WATER SHORTAGES WILL
MAKE HUMAN SUFFERING INCREDIBLE BY MODERN STANDARDS.
THE VAST MAJORITY OF NATIVE TREES WILL BE SNAPPED OR UPROOTED.
ONLY THE HEARTIEST WILL REMAIN STANDING. ...BUT BE TOTALLY
DEFOLIATED. FEW CROPS WILL REMAIN. LIVESTOCK LEFT EXPOSED TO
THE WINDS WILL BE KILLED.
AN INLAND HURRICANE WIND WARNING IS ISSUED WHEN SUSTAINED
WINDS NEAR HURRICANE FORCE. ...OR FREQUENT GUSTS AT OR ABOVE
HURRICANE FORCE. ...ARE CERTAIN WITHIN THE NEXT 12 TO 24 HOURS.
ONCE TROPICAL STORM AND HURRICANE FORCE WINDS ONSET. ...DO NOT
VENTURE OUTSIDE! (NOAA, August 28, 2005)

Rationale

When the National Oceanic and Atmospheric Administration (NOAA) issued this dramatic, fear-provoking warning the morning before Hurricane Katrina's landfall in August of 2005, residents of the Gulf Coast knew this could be one of the worst hurricanes this nation had ever witnessed. Although Katrina's wind speed did not come close to matching that of Hurricane Camille's Mississippi coast landfall in 1969, the incomprehensible damage Katrina inflicted upon residents of Louisiana, Mississippi and Alabama—physical, psychological, social and economic—will take many years to overcome.

Southeast Louisiana first began to feel the effects of Hurricane Katrina on Sunday, August 28, 2005 (Guin et al., 2009). The storm had strengthened to a Category 5 hurricane on the Saffir-Simpson Hurricane Wind Scale that morning (Guin et al., 2009). By afternoon, the storm surge was beginning to push inland, and the coastal region had, for the most part, completed its preparations and evacuations by this time (Guin et al., 2009). Contraflow was continuous, and westbound traffic along Interstate 10 flowed at a rate of about 2,500 vehicles per hour (Guin et al., 2009). By approximately 4 p.m., the outer rain bands of Katrina had reached the city of New Orleans (Guin et al., 2009). Contraflow was discontinued by 5 p.m. due to worsening weather conditions (Guin et al., 2009). By the time Katrina arrived, more than one million people had evacuated the New Orleans region, some 12,000 people found shelter in the Louisiana Superdome and approximately 130,000 people rode out the storm in their homes, businesses, or with close friends and family (Guin et al., 2009).

The eye of Hurricane Katrina made landfall near Buras, Louisiana, at approximately 6 a.m. on Monday, August 29, with maximum sustained winds in the Category 2 range, or approximately 105 mph. (Guin et al., 2009) Katrina's storm surge was enormous, with computer

models predicting elevations as high as 24 feet above normal and inundating nearly 350 miles of coastline. A peak surge height of nearly 28 feet was measured near Bay St. Louis, Mississippi (Guin et al., 2009).

Hurricane Katrina's destruction has been well documented. The sheer size of her devastating aftermath made other major U.S. disasters that preceded it pale by comparison, including the Chicago Fire of 1871, the San Francisco Earthquake and Fire of 1906, and Hurricane Andrew in 1992 (Townsend, 2006).

The total estimated losses for Katrina, as identified by Isidore (2006), according to the Insurance Information Institute, are estimated to be at \$125 billion (est. 2005 USD). The storm impacted 108,456 square miles, an area the size of Great Britain, (Department of Homeland Security, 2008), left 80% of New Orleans submerged, caused more than 1,500 casualties, damaged and/or destroyed more than 200,000 homes, impacted over 71,000 businesses and was responsible for more than 300,000 job losses in Louisiana alone (Governor's Office of Homeland Security and Emergency Preparedness, 2006).

Just as residents were readying their homes for the storm prior to evacuating the city that August of 2005, the New Orleans medical community, as well as other healthcare facilities along the coast who found themselves in Katrina's potential path, also were engaged in a high level of preparation. For most of these facilities, this meant immediate implementation of an emergency plan specific to hurricanes, setting into motion a series of highly complex, detailed steps designed to ensure that staff were able to deliver the highest level of patient care possible under the most trying of circumstances. Most hospital facilities, having been through previous storms successfully, had no reason to think their plans were inadequate. Katrina would put those plans to the ultimate test (Danna & Cordray, 2010).

Hurricane Rita crossed into the Gulf of Mexico and hammered the Louisiana/Texas coastline with yet another significant blow on September 24, 2005, exacerbating an already critical situation in a region still reeling from Katrina. Rita, too, had reached Category 5 status on the Saffir-Simpson scale but weakened to a Category 3 hurricane before making landfall along the Texas-Louisiana border, with estimated sustained winds of 115 mph and a storm surge peaking at about 15 feet above sea level (Guin et al., 2009).

Medical facilities in coastal Louisiana, Texas and Mississippi suffered considerable losses due to Hurricanes Katrina and Rita, with many becoming essentially inoperable due to heavy damage to their physical plants caused by wind and flooding (Danna & Cordray, 2010). Compounding problems for many of them was loss of communication, security concerns, managing an influx of people seeking care and shelter, contending with the loss of potable water, plumbing, electricity and supplies, including food and pharmaceuticals (Danna & Cordray, 2010).

Emergency preparedness in hospitals is a serious concern, not just locally, but globally. “Natural disasters are becoming more frequent and severe, and the capabilities of the medical community are increasingly being pushed to the limit. Every disaster brings new challenges” (Guin et al., 2008, p. 9). Several events in recent years, including the terrorist attacks of 9/11, the Indian Ocean tsunami, the Gulf Coast hurricanes, earthquakes in Haiti and New Zealand, as well as the devastating Japanese earthquake and tsunami of 2011, all illustrate the magnitude and importance of planning and preparing for disaster.

During the past decade, the United States has done much to increase its ability to plan and prepare for crises, whether natural or man-made. The creation of the Department of Homeland Security (DHS), its National Response Framework (NRF), the Federal Emergency

Management Agency (FEMA) and Stafford Act are but a few of the national investments made at President George W. Bush's behest to enhance the country's ability to successfully respond to crisis. States, municipalities and private businesses also are placing a greater emphasis on emergency management, helping to prevent loss of life and property and ensure business continuity.

The nation's hospitals have historically done an admirable job of planning and preparing for emergencies in order to maintain accreditation. Recent tragedies are causing hospitals to more intensively review their strategies and broaden their approach to emergency preparation—an approach that is less institution-specific and much more community-oriented (Joint Commission on Accreditation of Hospitals, 2003).

Why Hospital Preparedness Is Important

Recent Gulf Coast storms and other catastrophic events nationwide have illustrated the central role hospitals can and should play in a community's disaster recovery infrastructure. As a result of this role and responsibility, hospitals are being asked to increase significantly their level of emergency preparedness in terms of planning, leadership and participation, all at a time when resources are becoming more constrained (Joint Commission on Accreditation of Hospitals, 2003). Given the unpredictability of the world today, with the possibility of a mass casualty crisis constantly threatening, there is an urgent need to seek and achieve higher levels of readiness. If a hospital organization is not investing in emergency preparedness on a continuous basis, constantly reviewing plans and procedures for ways to make them more effective, that facility and its community are placed at higher risk. While the cost of preparing is high, the cost of not doing so is higher still.

Purpose Statement

The purpose of this study was to investigate the current preparation and emergency response status of nine United States Gulf of Mexico region hospitals to weather-related emergencies and other hazards.

Significance of the Study

“This is not our world as we once knew it. It is no longer sufficient to develop disaster plans and dust them off if a threat appears imminent. Rather, a system of preparedness across communities must be in place every day” (Joint Commission on Accreditation of Healthcare Organizations, 2003, p. 4). There is no doubt that disasters—tsunamis, earthquakes, floods, fires, snowstorms, tornadoes, heat waves, not to mention terrorist acts and man-made calamities—are becoming more frequent. Are tragedies like Hurricane Katrina the new normal?

Even those who deny the existence of global climate change are having trouble dismissing the evidence of the last year. In the U.S. alone, nearly 1,000 tornadoes have ripped across the heartland, killing more than 500 people and inflicting \$9 billion in damage. The Midwest suffered the wettest April in 116 years, forcing the Mississippi to flood thousands of square miles, even as drought-plagued Texas suffered the driest month in a century. Worldwide, the litany of weather’s extremes has reached biblical proportions. The 2010 heat wave in Russia killed an estimated 15,000 people. Floods in Australia and Pakistan killed 2,000 and left large swaths of each country under water. A months-long drought in China has devastated millions of acres of farmland. And the temperature keeps rising: 2010 was the hottest year on earth since weather records began (Begley, 2011, p. 42).

Scientists disagree about whether climate change will bring more intense or frequent tornadoes, but there is wide consensus that the 2 degrees Fahrenheit of global warming of the last century is behind the rise in sea levels, more intense hurricanes, more heat waves, and more droughts and deluges (Begley, 2011, p. 43).

As reported by Nates and Moyer in October 2005, trends show an alarming increase in the number of disasters globally.

As we have seen with the Asian tsunami (of 2002) and Hurricane Katrina, as populations increase in vulnerable areas, the problem is getting worse. The Centre for Research on Epidemiology of Disasters (CRED) at the Catholic University of Louvain in Belgium and

the U.S. Office of Foreign Disaster Assistance (OFDA) have collaborated to create a joint Emergency Disaster Database (EM-DAT) (Figure 1). The trends shown are alarming, and although the exponential rise in the number of disasters could be biased by over-reporting and other factors, the vast and increasing number of people affected demands our attention (Figure 2) (Nates & Moyer, 2005).

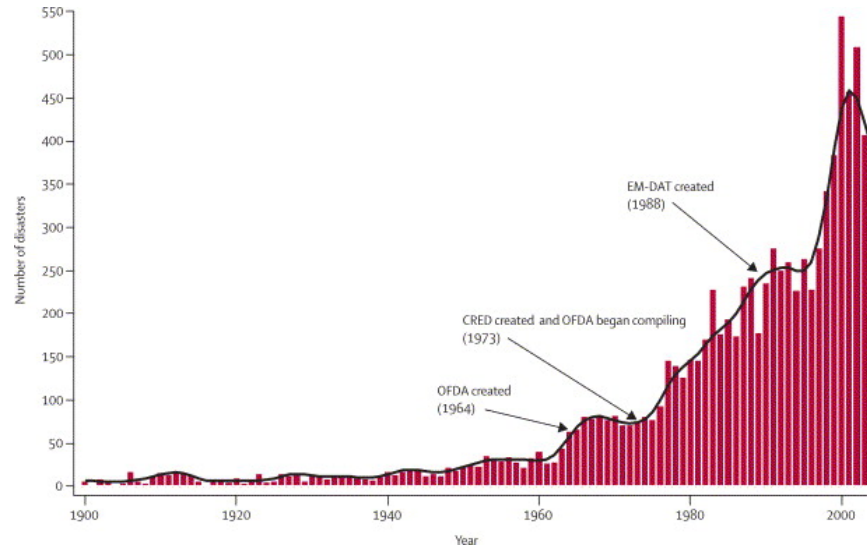


Figure 1: Natural disasters reported, 1900-2004 (EM-DAT, 2005).

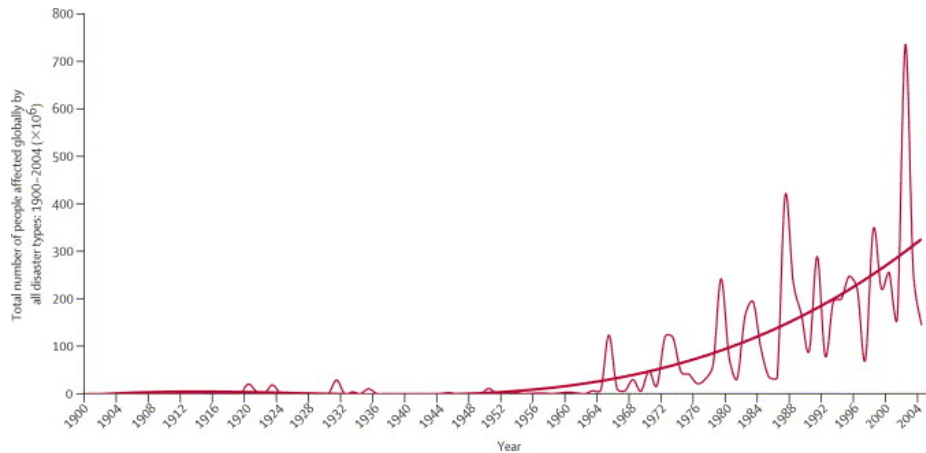


Figure 2: Total number of people affected globally by all disaster types, 1900-2004 (EM-DAT, 2005).

As we look at the whole picture, it appears that the poor outcome in many of these disasters is not the result of lack of knowledge but rather the result of inaction and poor implementation of the necessary measures to prevent, contain, or mitigate the impact of natural disasters on the populations exposed; this, of course, after discounting the

enormity of the catastrophes involved. Memory of previous events in history is short; George Santayana once said, “He who forgets history is destined to repeat it.” It seems to us that if we do not react soon with rapid and effective changes to our current emergency responses and leadership, we will knowingly and sadly be repeating history in many more opportunities to come (Nates & Moyer, 2005).

After bearing the brunt of several major, damaging storms for the past five years, hospitals along the coast in Louisiana, Mississippi and Texas have been intensively involved in their own and their communities’ recoveries—rebuilding their respective facilities and human resources so they can offer quality healthcare services to their communities. It is now time to take a closer look at the many lessons learned during the hospitals’ experiences in 2005 to determine what strategies have been implemented and what is yet to be done. Questions this study addressed are as follows:

- Are hospitals prepared for the next Katrina or worse?
- What critical needs exist that have yet to be addressed?
- Is hospital emergency planning overall more robust?
- Are we teaching and preparing our new medical practitioners—physicians, nurses and others—who will bear the responsibility of caring for the ill and injured during disaster?

Objectives of the Study

The objectives of this study were:

1. To review and describe major problems and issues experienced by Gulf Coast region medical facilities before and during Hurricane Katrina.
2. To obtain and describe hospital administrative and operational staff’s viewpoints on critical emergency plans, practices and implementation, as well as improvements, relative to evacuation versus shelter-in-place strategies; training and drills; supplies; reimbursement; policies and plans; communication; and staffing.

3. To identify trends and best practices in coastal healthcare facilities, tangible and intangible, in emergency preparedness.
4. To determine the degree to which lessons learned and best practices were put into practice following Hurricanes Katrina and Rita.
5. To identify opportunities for future research.

Research Question

What strategies are hospitals in coastal Louisiana, Mississippi and Texas using in their emergency preparedness plans five years since Hurricanes Katrina and Rita to facilitate their ability to respond more effectively under crisis conditions and to maintain critical patient care operations?

Much has been written since 2005 regarding “lessons learned” by the medical community during Hurricanes Katrina and Rita. Hurricanes Gustav and Ike, which struck and affected the Louisiana and Texas coastlines in September 2008, offered an opportunity for further study of emergency preparation, partnerships and planning. These studies have generated tremendous progress, informing facilities far beyond the U.S. Gulf Coast about the most recent best practices and suggestions on long- and short-term preparedness improvements.

Hospitals are a place of safe harbor and refuge for the most vulnerable in the community—sick patients who are the least able to care for themselves during a disaster. Yet, hospitals often are also the most vulnerable during a disaster due to their dependence on the availability of utilities, food, water, medicines, communications, transportation, and a skilled workforce (Danna & Cordray, 2010).

This study sought to determine what hospitals along the Gulf Coast are doing to continue their preparedness efforts five years post-Katrina. The researcher sought to determine what nine selected facilities learned as a result of their experiences during Hurricane Katrina, as well as Hurricanes Rita, Ike and Gustav. Key questions addressed during this research were:

- Are hospitals still preparing for the next storm with a sense of urgency or has complacency set in now that no major storms in the Gulf of Mexico have made landfall in Gulf Coast states during the past three years?
- Are hospitals making the time and investing in training personnel in the latest emergency response techniques to allow for the best possible outcome when faced with crisis?
- Under what conditions should a hospital plan to evacuate or shelter-in-place?
- If not a total evacuation, which patients should stay and which should be transferred elsewhere?

By interviewing hospital administrators and emergency preparedness personnel, the study sought to discover answers to these questions.

Definitions of Terms:

Advanced-Warning Event: “A disaster that decision teams and staff are tracking as they consider whether it may warrant evacuating their facility” (Agency for Healthcare Research and Quality, p. 10).

Agency for Healthcare Research and Quality (AHRQ): “The Agency for Healthcare Research and Quality's mission is to improve the quality, safety, efficiency, and effectiveness of health care for all Americans. Information from AHRQ's research helps people make more informed decisions and improve the quality of health care services. AHRQ was formerly known as the Agency for Health Care Policy and Research” (<http://www.ahrq.gov/about/budgtix.htm>).

All-Hazards: “Describing an incident, natural or man-made, that warrants action to protect life, property, environment, and public health or safety, and to minimize disruptions of government, social, or economic activities” (Federal Emergency Management Agency, 2009, p. 12-1).

Chain of Command: “A series of command, control, executive, or management positions in

hierarchical order of authority” (Federal Emergency Management Agency, 2009, p. 12-2).

Contraflow: “A temporary arrangement in which traffic travels in the same direction on both sides of the road” (<http://rox.com/vocab/contraflow>).

Critical Infrastructure: “Assets, including physical systems, other support systems, and staff, that are essential to operate a hospital and provide a standard level of care to patients” (AHRQ, p. 10).

EMSTAT: “A computerized database to which Louisiana hospitals report status of operations (open, limited, closed); census and availability of beds by category (Medical/Surgical, Intensive Care Unit, Pediatric, Psychiatric, etc.); generator information; and other resources that may be needed by hospitals in an emergency (blood products, fuel, pharmaceuticals, personnel, etc.)” (Louisiana Hospital Emergency Preparedness and Response Network, 2009, p. 8).

Extra-corporeal Membrane Oxygenation (ECMO): “This system provides heart-lung bypass support outside of the baby’s body. ECMO is used in infants who are extremely ill due to breathing or heart problems” (National Library of Medicine <http://www.nlm.nih.gov/medlineplus/ency/article/007234.htm>).

Emergency Operations Center (EOC): “The physical location at which the coordination of information and resources to support incident management (on-scene operations) activities normally takes place. An EOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction. EOCs may be organized by major functional disciplines (e.g., fire, law enforcement, and medical services), by jurisdiction (e.g., Federal, State, regional, tribal, city, county, parish), or some combination thereof” (Federal Emergency Management Agency, 2009, p. 12-5).

Essential Employee: An employee essential to a hospital's operation during a crisis.

Evacuation: "Organized, phased and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas"

(Federal Emergency Management Agency, 2009, p. 12-9).

Federal Highway Administration (FHWA): "The Federal Highway Administration (FHWA) is an agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). Through financial and technical assistance to State and local governments, the Federal Highway Administration is responsible for ensuring that America's roads and highways continue to be among the safest and most technologically sound in the world" (www.fhwa.dot.gov/about/).

Federal Emergency Management Agency (FEMA): "FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards" (<http://fema.gov/about/index.shtm>).

Hazard Vulnerability Analysis (HVA): "A process to identify hazards and associated risk to persons, property, and structures and to improve protection from natural and human-caused hazards" (FEMA, 2009, pp. 12-7 – 12-8).

Health Resources and Services Administration (HRSA): "HRSA is the primary Federal agency for improving access to health care services for people who are uninsured, isolated, or medically vulnerable" (www.hrsa.gov).

HVAC: “Heating, ventilation and air conditioning (<http://www.merriamwebster.com/dictionary/hvac>).

Incident Command System (ICS): “An incident command organization made up of the command and general staff members and appropriate functional units of an incident command system organization” (FEMA, 2009, p. 12-9).

Joint Commission: “An independent, not-for-profit organization, The Joint Commission accredits and certifies more than 18,000 health care organizations and programs in the United States. Joint Commission accreditation and certification is recognized nationwide as a symbol of quality that reflects an organization’s commitment to meeting certain performance standards” (www.jointcommission.org).

Medical Institution Evacuation Plan (MIEP): “The MIEP was developed for hospitalized patients in light of Hurricanes Katrina and Rita when 37 hospitals were evacuated post-storm for Hurricane Katrina and 21 hospitals were evacuated pre-storm for Hurricane Rita. The need for an MIEP was verified in 2008 during Hurricanes Gustav and Ike when, in Louisiana, patients were evacuated through the Lakefront and Channault Aeromedical Marshalling Points (AMPs). The plan may be activated only during times of state-declared emergencies and primarily addresses the three coastal parishes in Louisiana Region 3 that are particularly vulnerable to hurricanes, e.g. St. Mary, Terrebonne and Lafourche (parishes)” (www.lhaonline.org).

Mitigation: “Activities providing a critical foundation in the effort to reduce the loss of life and property from natural and/or man-made disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities. Mitigation seeks to fix the cycle of disaster damage, reconstruction and repeated damage. These activities or actions, in most cases, will have a long-term sustained effect” (FEMA, 2009, p.12-12).

Mutual Aid and Assistance Agreement: “Written or oral agreement between and among agencies/organizations and/or jurisdictions that provides a mechanism to quickly obtain emergency assistance in the form of personnel, equipment, materials and other associated services. The primary objective is to facilitate rapid, short-term deployment of emergency support prior to, during and/or after an incident” (FEMA, 2009, p.12-13).

National Disaster Medical System (NDMS): “A federally coordinated system that augments the Nation’s medical response capability. The overall purpose of the NDMS is to establish a single, integrated national medical response capability for assisting State and local authorities in dealing with the medical impacts of major peacetime disasters. NDMS, under Emergency Support Function #8—Public Health and Medical Services, supports Federal agencies in the management and coordination of the Federal medical response to major emergencies and federally declared disasters” (FEMA, 2009, p. 12-13 – 12-14).

National Incident Management System (NIMS): “A system that provides a proactive approach guiding government agencies at all levels, the private sector, and nongovernmental 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, 2009, p. 12-14).

National Response Framework (NRF): “Guides how the Nation conducts all-hazards response. The NRF documents the key response principles, roles and structures that organize national response. It describes how communities, States, the Federal Government, and other private-sector and nongovernmental partners apply these principles for a coordinated, effective national response. It describes special circumstances where Federal interests are involved and catastrophic incidents where a State would require significant support. It allows first responders,

decision-makers, and supporting entities to provide a unified national response” (FEMA, 2009, p. 12-15).

Office of the Assistant Secretary for Preparedness and Response (ASPR): “The Office of the Assistant Secretary for Preparedness and Response (formerly the Office of Public Health Emergency Preparedness) was created under the Pandemic and All Hazards Preparedness Act in the wake of Katrina to lead the nation in preventing, preparing for, and responding to the adverse health effects of public health emergencies and disasters. ASPR focuses on preparedness planning and response; building federal emergency medical operational capabilities; countermeasures research, advance development, and procurement; and grants to strengthen the capabilities of hospitals and health care systems in public health emergencies and medical disasters. The office provides federal support, including medical professionals through ASPR’s National Disaster Medical System, to augment state and local capabilities during an emergency or disaster” (<http://phe.gov/about/aspr/Pages/default.aspx>).

Office of the Inspector General (OIG): “The OIG develops and distributes resources to assist the health care industry in its efforts to comply with the Nation's fraud and abuse laws and to educate the public about fraudulent schemes so they can protect themselves and report suspicious activities” (<http://oig.hhs.gov/about-oig/about-us/index.asp>).

Parish: “In Louisiana, a civil division corresponding to a county in other states” (<http://www.dictionary.net/parish>).

Post-Event Decision: “The decision whether or not, in the aftermath of an event, to evacuate a hospital” (AHRQ, p. 10).

Post-Event Evacuation: “An evacuation carried out after an event” (AHRQ, p. 11).

Pre-Event Decision: “The decision whether faced with an impending event to 1) preemptively

evacuate a hospital or 2) shelter-in-place” (AHRQ, p. 10).

Pre-Event Evacuation: “An evacuation carried out prior to an impending event when the hospital structure and surrounding environment are not yet significantly compromised; a pre-event evacuation is ordered when the anticipated effects of an impending disaster would either place patients and staff at risk or make an evacuation extremely dangerous or impossible at a later time” (AHRQ, pp. 10-11).

RallyPoint: “A crisis communication and business continuity system that combines all modes of standard communication with the web and a touch-tone based phone system”
(www.myrallypoint.net).

Saffir-Simpson Scale: “The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 categorization based on the hurricane's intensity at the indicated time. The scale—originally developed by wind engineer Herb Saffir and meteorologist Bob Simpson—has been an excellent tool for alerting the public about the possible impacts of various intensity hurricanes. The scale provides examples of the type of damage and impacts in the United States associated with winds of the indicated intensity. In general, damage rises by about a factor of four for every category increase”
(www.nhc.noaa.gov).

Shelter-In-Place: “Means people inside a building should remain inside until the danger passes. Shelter-in-place protection is used when evacuating the public would cause greater risk than staying where they are, or when an evacuation cannot be performed” (WMD (Weapons of Mass Destruction) Response Guidebook, 2006, p. 34).

Special Needs Populations: “Populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care. Individuals in

need of additional response assistance may include those who have disabilities; who live in institutionalized settings; who are elderly; who are children; who are from diverse cultures; who have limited English proficiency or are non-English speaking; or who are transportation disadvantaged” (FEMA, 2009, p. 12-20).

Weapons of Mass Destruction: “A chemical, biological, or radioactive weapon capable of causing widespread death and destruction” (<http://dictionary.reference.com/browse/weapons+of+mass+destruction>).

CHAPTER 2.

REVIEW OF THE LITERATURE

Introduction

The most detailed description of conditions during the crisis came from Charity Hospital, the venerable public hospital that was surrounded by waist-deep water. There were accounts of dozens of critically ill patients being carried up and down dark stairwells because the elevators were not working, hospital personnel using jerry-rigged ventilators to physically breathe for patients, family members fanning patients for hours in the sweltering rooms, workers using buckets or plastic bags as toilets, doctors making rounds by flashlight, personnel unable to check lab values or use electronic devices for IV medications, patients occupying stretchers in the halls, the emergency department moving from the first to the second floor to escape the floodwaters, personnel brushing teeth and feeding each other with IV fluid after food ran out on Wednesday, people sleeping on the roof to escape the heat and stench, bodies being stacked in a stairwell because the basement morgue was both full and inaccessible and personnel feeling that the hospital had been forgotten after telephones and electronic communication failed (Gray & Hebert, 2006, p. 6).

Hurricane Katrina made landfall on Monday, August 29, 2005, at approximately 6 a.m. at Buras, Louisiana. By the time the storm was over, the staff and patients of most New Orleans area hospitals were hot and tired, but feeling a sense of relief that the worst had passed. Like they had with most past storms, they began assessing the damage and the tasks associated with getting their facilities back to normal. However, numerous levee breaches created extensive flooding in New Orleans, and by Tuesday, August 30, 80% of the city was under several feet of water. This created a critical problem for the area's healthcare providers.

In those hours and days immediately after Katrina, affected hospitals, many of them islands surrounded by water several feet deep, faced the need to totally evacuate their facilities. There was no power. Elevators were out. Temperatures were at or above 100 degrees in many facilities. There were no phones. Cell phone communication was sporadic if not nonexistent. Most had a very limited supply of fuel, and what water and food they did have would eventually run out. Rumors and misinformation were rampant. How do you take care of patients, some of

them critically ill, under these dire circumstances, not to mention simultaneously caring for staff, family members of staff, patients and even pets sheltered in your facility (Danna & Cordray, 2010)?

Dr. Gray and Dr. Hebert (2006) of the Urban Institute stated, “No other facilities house such large concentrations of people who cannot meet their own needs, who may require ongoing life support, and who cannot manage their own evacuation” (p. 14). This is why it is so important—with their primary mission of caring for and healing some of our community’s most vulnerable citizens—that hospitals must take lessons learned from their disaster experiences seriously and implement policy changes to prepare for and harden themselves against the next crisis (Arendt & Hess, 2008).

Hurricane Katrina illustrated this point, perhaps more than any other domestic disaster this country has ever faced. While hospitals in New Orleans and across the Gulf Coast did indeed perform nobly, selflessly caring for their patients in extreme adverse conditions created by the storm, they also presented some of the community’s most difficult challenges once flooding made their evacuation necessary (Gray & Hebert, 2006).

Since 9/11, there have been continued efforts to improve emergency preparedness across the nation. Among these improvements are policy development, improvement of emergency management standards, identification of competencies needed for health care providers, and federal and state legislation that establishes improvement for health care workers facing inevitable disasters (Danna & Cordray, 2010, p. 229).

These major steps have positioned hospitals to perform and respond better in emergency situations. But even with the improvements made since 9/11, the events associated with Hurricane Katrina provided a clear, indisputable example that considerably more work was necessary to plan and prepare for large disasters, no matter where, when or what the hazard may be. “Never before in the U.S. has an entire city’s health care system gone down overnight”

(Terrazas & Morales, 2006, p. 1).

Tarrazas and Morales (2006) stated traditional education and training did not prepare hospital administrators for the following situations:

- Contingency planning of such magnitude,
- Patient evacuation in adverse conditions,
- Maintaining patients and staff without utilities, food, and support,
- Reconstitution of a health care system,
- Short-range planning for health care system survival,
- Rejuvenating a reimbursement system in temporary medical facilities and
- Contingency medical operations (Tarrazas & Morales, 2006, p. 2).

Despite all of the negativity associated with Hurricane Katrina—the missteps, the chaos, the many painful losses and unbelievable human suffering—the storm had at least one positive outcome in that it served as a catalyst for improvement. “The Congressional and White House reports, for example, emphasize the need for better advance planning, better communications, more rapid deployment of resources and better coordination” (Gray & Hebert, 2006, p. 13).

Lessons learned have given way to improved public policy, enhanced multidisciplinary planning, and increased collaboration and cooperation. “The private sector and government are focused on improved communications and cooperation. Investments have been made in technology to ensure that communications are maintained in a disaster. Legislation has been passed” (Danna & Cordray, 2010, p. 242).

It has now been more than five years since Hurricanes Katrina and Rita devastated the Gulf Coast region. For the New Orleans community, Hurricane Gustav’s arrival in September 2008 provided an opportunity to test the lessons learned and the plans and preparations made during the three years since the storms of 2005. While Gustav did not fully test those plans and preparations, evidence indicated that New Orleans area hospitals performed well due to intensive effort put forth in the three years since Hurricane Katrina (Arendt & Hess, 2008). In the time

since Katrina, acute care hospitals in the New Orleans area had made significant modifications in their preparedness plans, allowing them to be self-sufficient in some cases for up to a month (Arendt & Hess, 2008). “At the same time, these hospitals had developed and nurtured a regional perspective on emergency preparedness, response and recovery in the three years since Katrina” (Arendt & Hess, p. 7). This regional planning perspective, in particular, helped hospitals tremendously in their ability to respond to a weather threat in a logical, ordered, coordinated manner.

U.S. Legislation Related to Disaster Preparedness and Support

The United States is no stranger to crises or tragedies. Like Katrina, the terrorist acts of September 11, 2001, served as a vehicle for change, with the events of that day proving to our nation’s leaders and citizens just how vulnerable we were to emergencies.

The attacks in New York City, Pennsylvania and our nation’s capital revealed frightening gaps in our country’s ability to obtain accurate and timely intelligence reports as well as to respond to large-scale mass casualty events and disasters. When 9/11 occurred, the U.S. wasted no time in reorganizing and reinvesting in the manpower and resources necessary to significantly bolster the nation’s ability to not only prevent a similar incident from happening again but also to create the necessary infrastructure to allow for rapid response to domestic disasters.

The sheer scale of the Katrina catastrophe and the flaws as well as opportunities it uncovered, caused doctors, hospitals and the government to take yet another long look at existing emergency response plans for disaster. “In the years since the storm, major steps have been taken to streamline federal disaster preparedness bureaucracies and to assess and respond more quickly to medical needs” (O’Reilly, 2010, ¶ 4).

The Homeland Security Act of 2002 is the foremost legislation of the past decade that has

contributed to our nation's emergency response capabilities. This act established a Department of Homeland Security (DHS) as an executive department in the United States government. The Homeland Security Act united component agencies into the department, including the Federal Emergency Management Agency (FEMA). The Secretary of Homeland Security leads this department and has the ultimate authority over its functions, officers, employees and reporting units (The National Response Framework, p. 1).

It is worth remarking that the Homeland Security Act assigns certain responsibilities specific to the U.S. National Response Framework (NRF) and the National Incident Management System (NIMS). These initiatives have allowed the U.S. to create a comprehensive, national incident management system in response to attacks and/or disasters, while working in collaboration with federal, state and local government personnel, agencies and authorities. This legislation enables the U.S. to respond in a clear, unified, coordinated and collaborative manner (National Response Framework, p. 2).

Important government interventions also have included The Robert T. Stafford Disaster Relief and Emergency Assistance Act. This Act details the programs and processes by which the federal government provides disaster and emergency assistance to state and local governments, tribal nations, eligible private nonprofit organizations and individuals affected by a declared major disaster or emergency. The Stafford Act covers all hazards, including natural disasters and terrorist events, and initiates a process for a governor to request that the President declare a major disaster or emergency (National Response Framework, p. 3). These laws played a critical role in the nation's response to Hurricanes Katrina and Rita. Legislation continues to be improved and created to enhance preparedness and response efforts.

The Joint Commission

Federal and state laws and agencies impact health care facilities' operations where emergency preparedness, response and support is concerned. The Joint Commission (TJC) also plays a major role in assisting hospitals and healthcare organizations in preparing for emergencies. TJC is an independent, non-profit organization that was founded in 1951 by the American College of Physicians, the American Hospital Association, the American Medical Association, and the Canadian Medical Association, in collaboration with the American College of Surgeons to provide voluntary accreditation of health care organizations (Joint Commission, 2009). TJC has a long history of establishing performance standards that measure quality, performance improvement and outcomes through its accreditation and certification surveys (Danna & Cordray, 2010). Hospitals wishing to establish and/or maintain accreditation must undergo a periodic and rigorous site visit by TJC, including an evaluation of their policies and procedures, both of which are held to a set of detailed performance standards.

According to TJC, "It is no longer sufficient to develop disaster plans and dust them off if a threat appears imminent. Rather, a system of preparedness across communities must be in place every day" (Joint Commission on Accreditation of Healthcare Organizations, 2003, p. 4).

In an effort to improve public policy, TJC recommends healthcare organizations pay heed to the following recommendations when putting together their emergency plans:

- (1) Enlist the community's help in preparing the local response.
- (2) Focus on key aspects of the preparedness system that will enable community health care resources to be used in the best possible way to care for patients, protect staff and serve the public.
- (3) Establish accountabilities, supervision, leadership and continuity of community preparedness systems (Joint Commission on Accreditation of Healthcare Organizations, 2003, pp. 8-9).

After Hurricane Katrina, TJC obtained feedback from numerous hospitals affected by

Katrina's wrath. As a result, TJC has recommended hospitals focus on six critical areas of emergency response in order to assess their needs and prepare staff to respond to events most likely to occur regardless of the causes of an emergency situation.

The six critical areas of emergency management are as follows:

1. **Communication:** In the event that community infrastructure is damaged and/or an organization's power or facilities experience debilitation, communication pathways, whether dependent on fiber cables, electricity, satellite or other conduits are likely to fail. Organizations must develop a plan to maintain communication pathways both within the organization and to critical community resources.
2. **Resources and Assets:** A solid understanding of the scope and availability of an organization's resources and assets is as important, and perhaps more important, during an emergency than during times of normal operation. Materials and supplies, vendor and community services, as well as state and federal programs, are some of the essential resources that organizations must know how to access in times of crisis in order to ensure patient safety and sustain care, treatment and services.
3. **Safety and Security:** The safety and security of patients is the prime responsibility of the organization during an emergency. As emergency situations develop and parameters of operability shift, organizations must provide a safe and secure environment for their patients and staff.
4. **Staff Responsibilities:** During an emergency, the probability that staff responsibilities will change is high. As new risks develop along with changing conditions, staff will need to adapt to their roles to meet new demands on their ability to care for patients. If staff cannot anticipate how they may be called upon to perform during an emergency, the likelihood that the organization will not sustain itself during an emergency increases.
5. **Utilities Management:** An organization is dependent on the uninterrupted function of its facilities during an emergency. The supply of key utilities, such as potable water, ventilation and fuel must not be disrupted or adverse events may occur as a result.
6. **Patient Clinical and Support Activities:** The clinical needs of patients during an emergency are of prime importance. The organization must have clear, reasonable plans in place to address the needs of patients during extreme conditions when the organization's infrastructure and resources are taxed (TJC EM Standards, 2011, ¶ 4).

When organizations have a thorough understanding of their plans to respond to these six critical areas of emergency management, they have developed an "all-hazards" approach that provides for a level of preparedness that is of adequate depth and detail to address a range of

emergencies (TJC EM Standards, 2011).

TJC also recommended that healthcare organizations spend sufficient time “to identify potential hazards, threats and adverse events and assess their impact on the care, treatment and services they must sustain during an emergency. This assessment is known as a Hazard Vulnerability Analysis (HVA) and is designed to assist organizations in gaining a realistic understanding of their vulnerabilities and to help focus their resources and planning efforts” (TJC, EM Standards, 2011, ¶ 4).

TJC requires accredited organizations to use the information received from the assessments to develop their specific Emergency Operations Plan (EOP), which organizations are required to test regularly, with lessons learned being incorporated to continuously improve the plan (TJC, EM Standards, 2011, ¶ 5).

The National Response Framework and the National Incident Management System

The National Response Framework and the National Incident Management System also have a bearing on how hospitals plan for and respond to emergencies. In 2005, the Department of Homeland Security issued the National Response Framework (once known as the National Response Plan or NRP) to provide guidance for boosting the national emergency response process.

The NRF enhances the ability of the U.S. to prepare for and manage domestic incidents by establishing a single, comprehensive national approach that coordinates all levels of government and ensures cooperation with the private sector. The NRF is an all-hazards plan under which federal resources are provided by 27 federal departments and agencies and the American Red Cross. Resources are organized into 12 emergency support functions (or ESFs). Each ESF is headed by a primary agency and supported by other federal agencies as appropriate. Medical and public health resources are deployed through the Department of Health and Human Services Office of Emergency Preparedness as defined under ESF 8, Health and Medical Services. (American Medical Association, p. 7)

FEMA is the primary federal agency with the responsibility for carrying out the NRF.

The primary mission of FEMA is to reduce the loss of life and property and protect the nation from all hazards, including natural disasters, acts of terrorism and other manmade disasters, by leading and supporting the Nation in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery and mitigation (National Response Framework, p. 2).

“While the NRF provides guidance for management and coordination of federal assistance following a disaster, a central principle of the NRF is that the local or state jurisdiction is in charge of managing the disaster response and that federal resources work to support local efforts” (American Medical Association, p. 7).

Another fairly recent development that has helped hospitals to respond in a more coherent and unified manner during an emergency has been their adoption of the National Incident Management System, sometimes referred to as NIMS or HICS (Hospital Incident Command System), in a hospital setting. Use of NIMS is required in hospitals in order to be eligible to receive some grant funding as well as reimbursement for disaster-related losses.

NIMS provides improved communication and coordination in an emergency and “was developed as a comprehensive national approach to incident management, applicable at all jurisdictional levels and across functional disciplines, to further the effectiveness of emergency response providers and incident management organizations across a full spectrum of potential incidents and hazard scenarios. NIMS provides for a central, unified command” (Louisiana Hospital Emergency Preparedness and Response Network, pp. 5-6).

Advantages of using unified command:

- A single set of objectives is developed for the entire incident.
- A collective approach is used to develop strategies to achieve incident objectives.
- Information flow and coordination is improved between all jurisdictions and agencies involved in the incident.
- All agencies with responsibility for the incident have an understanding of joint priorities and restrictions.
- No agency’s legal authorities will be compromised or neglected.

- The combined efforts of all agencies are optimized as they perform their respective assignments under a single Incident Action Plan (Townsend, p. 70).

By using a unified command under NIMS, the collective efforts of all agencies responding to a crisis will be more effective.

Plans and Procedures

The importance of hospitals spending time creating and practicing their emergency plans and procedures cannot be overstated. Hurricane Katrina proved this fact not only to hospitals, but to everyone from around the world who watched and studied the storm's aftermath.

As a result of what was learned in the storms of 2005, TJC has placed a greater emphasis on emergency planning and preparation in its process for obtaining and maintaining accreditation. In fact, it is so important that TJC has devoted an entire chapter in its accreditation manual to emergency management.

The Emergency Management (EM) chapter is organized to allow hospitals to plan to respond to the effects of potential emergencies that fall on a continuum from disruptive to disastrous. Planning involves those activities that must be done in order to put together a comprehensive Emergency Operations Plan (EOP). This planning results in the EOP document. After the EOP is in place, it must be tested through staged emergency response exercises in order to evaluate its effectiveness. Adjustments to the EOP can then be made (TJC, EM Standards, p. 1).

Just as important has been the adoption of NIMS by hospitals and healthcare organizations, which by so doing are making their emergency response plans in conjunction with broader community participation. According to a July 2006 report by the Urban Institute, "Hurricane Katrina showed that hospitals' advance planning had been inadequate in several respects. First, planning was left to individual hospitals, though the disaster was area-wide. Clearly, hospitals must be a major part of area-wide disaster and evacuation planning" (Gray & Hebert, 2006, p.15). The importance of hospitals and healthcare providers collaborating with their local and regional communities is key.

Additionally, hospitals, as Katrina has abundantly shown, are highly dependent on local infrastructure. Hospitals must make plans for the possibility that infrastructure will become non-functional. As stated by Gray and Hebert (2006) in their Urban Institute report,

Although the assumptions that hospitals would not be destroyed proved to be correct, their vulnerability to the secondary consequences of the storm was not anticipated either by governmental officials or by hospitals themselves. Katrina showed that hospitals depend heavily on citywide infrastructure—electrical power, communications, water, security and transportation—that can be disrupted by an area-wide disaster. Disaster planning for hospitals must incorporate the possible loss of essential infrastructure (Gray & Hebert, 2006, p.15).

Finally, Hurricanes Katrina and Rita also demonstrated the need to not only plan, but to practice your plan. One example of the importance of planning dealt with evacuation of New Orleans during Hurricane Ivan in September 2004.

The New Orleans evacuation for Katrina was facilitated by the ‘dress rehearsal,’ which had occurred the prior summer with Hurricane Ivan. The failures of the first ‘contra-flow’ traffic plan (reversing major highways so they are outbound only) had been exposed and largely corrected. This illustrates the importance of having a disaster plan, repeatedly rehearsing it and refining it and most importantly, paying attention to it (Dalovisio, 2006, ¶ 4).

Training

Disaster medicine has come into the forefront since the events of September 11, 2001, and as evidenced further with the recent earthquake and tsunami tragedies in Haiti, New Zealand and Japan. In the current atmosphere of these types of natural, as well as man-made disasters, hospital preparedness is a fundamental necessity. While TJC requires that all hospitals prepare emergency management plans that should be tested at least twice per year, the effectiveness of these drills remains to be determined (Babar & Rinker, 2005). According to Reilly & Markenson (2009),

Despite millions of dollars in public health preparedness funds distributed to hospitals in the U.S. each year, hospital personnel still lack appropriate training for staff in critical knowledge areas. Regulatory agencies and professional accrediting bodies must take a

more active role in providing hospitals with the tools necessary to comply with mandatory and recommended preparedness standards, and to increase the quality and availability of preparedness-related education and training for hospital workers. Without specific and tangible guidance from national organizations, hospitals will continue to lack the capacity to effectively respond to disasters and public health emergencies (§ 31).

Not only is it important for hospitals and their staff to have adequate disaster preparedness and response training, but physicians must also take the time and make the effort to obtain this training, as well. “At a minimum, physicians should know how to plan to keep their practices going after disaster strikes,” said Raymond E. Swienton, MD, co-director of the Section on Emergency Medical Services, Homeland Security and Disaster Medicine at the University of Texas Southwestern Medical Center in Dallas. Since 2003, some 100,000 health professionals—approximately 30% of them physicians—have taken advantage of all-hazards disaster preparedness training courses through the AMA-supported National Disaster Life Support Foundation. “We’ve made a dent in the overall mission to adequately train enough of the healthcare workforce,” said Dr. Swienton, who helped to develop the training courses. “It’s only a start in the number that needs to be trained” (O’Reilly, 2010, § 32).

Hurricane Katrina confirmed the need to plan and practice evacuation plans as well. Due to the complexities of evacuation, experts recommend conducting a regional hurricane evacuation exercise sufficient in scope to test all major elements of a hurricane evacuation plan, with participation from state, regional, and local agencies that have hurricane emergency preparedness responsibilities (U.S. Army Corps of Engineers). “Regardless of the scale, the goal of the exercise should be to test the effectiveness of each plan in affording the public a safe, efficient and effective evacuation from a hurricane threat” (U.S. Army Corps of Engineers, p. 14).

Additionally, the exercise should test officials’ ability to respond in the areas of

evacuation decision making, communications, public warnings, manpower/equipment deployment, resource allocation, emergency power systems, timing of issuing an evacuation order or advisory, shelter activation, emergency transportation and traffic control (U.S. Army Corps of Engineers).

A post-exercise review should be conducted to evaluate the effectiveness of each plan. Officials who participated in the exercise should also contribute to the review. Monitors should be asked to critique the activity to which they were assigned. A critique report should be published at the state level that documents the exercise methodology, identifies the problem areas and recommends improvements. Areas where future preparedness training would be beneficial should also be identified (U.S. Army Corps of Engineers, p. 14).

Surge Capacity

Another important aspect of hospital and healthcare planning in the world post-9/11 and Katrina is the development of “surge capacity” in our nation’s hospitals (TJC, 2003).

Comprehensive surge capacity plans are critical to anticipating and reacting to a mass casualty disaster event. According to an article published in 2007 in the National Association of Public Hospitals and Health Systems Research Brief, “Effective surge capacity requires the coordination of multiple resources, including beds, supplies, equipment, physical structure and staff” (National Association of Public Hospitals and Health Systems, 2007, p. 1). The number of hospital workers affects the number of operational beds a facility can operate, and correspondingly, the number of patients that can be cared for in the hospital. Hospitals can and do use many strategies to ensure sufficient staffing during an emergency, including providing daycare for employees’ children, sheltering their pets, and providing access to medication supplies for workers and their families (National Association of Public Hospitals and Health Systems). Hospitals also are investing in identifying and credentialing volunteer staff, as well as familiarizing employees regarding emergency preparedness equipment and protocol, how to erect and use surge tents, and use of associated ambulatory care sites (National Association of

Public Hospitals and Health Systems).

Evacuation

Gulf South residents focus primarily on hurricanes where emergency preparedness is concerned, as the southeastern Atlantic coast and entire Gulf Coast of the United States is at high and frequent risk of experiencing them. “For areas which might sustain exposure to winds of 150 mph, severe tidal surge or massive flooding, there are no structures which can be truly ‘safe’ and planned evacuation is clearly the most effective life-saving strategy” (Dalovisio, 2006, ¶ 4).

There are a variety of viewpoints as to whether a hospital should evacuate in preparation for an incoming storm or shelter-in-place. The decision to evacuate or not clearly is one of the most difficult a hospital administrator will ever face. The challenges of evacuating patients from a hospital are complex and many. Here are several that, according to The Urban Institute’s 2006 report, were experienced by New Orleans hospitals during Katrina.

1. Many patients have special requirements for both transportation and an appropriate destination. Patients who require artificial life support or who are immobilized create their own set of issues.
2. External coordination is essential as hospital evacuation is logistically difficult.
3. Appropriate destinations must be identified for patients who are to be evacuated, particularly those with critical care needs.
4. Evacuated patients must be accompanied by their medical records.
5. A system for tracking evacuees is necessary.
6. That many patients had family members with them was both a benefit and a complication; however, those same family members wanted to be evacuated along with their relatives which complicated the situation.
7. In a crisis, hospitals become magnets for people who want to help or who are seeking refuge. Decisions must be made in advance how a possible influx of refugees will be handled.
8. Advance agreement is needed among key parties about which patients will be evacuated first (Gray & Hebert, 2006, pp. 16-18).

With those challenges in mind, there are a number of resources and publications available to hospitals to help them plan should they be faced with an evacuation need.

One such publication is the *Hospital Evacuation Decision Guide*, published by the

Agency for Healthcare Research and Quality (AHRQ). The Guide, provides “hospital evacuation decision teams with organized and systematic guidance on how to consider the many factors that bear on the decision to order an evacuation,” and “assists decision teams in identifying some of the special situations, often overlooked, that may exist in their facility or geographic area that could affect the decision to evacuate” (AHRQ, 2010, p. 1). The Guide does not offer a standard evacuation plan or response as “No single formula or algorithm could possibly capture all of the nuances involved in the decision or the myriad different disaster scenarios that may lead to a hospital evacuation” (AHRQ, 2010, p. 1). Alternately, the Guide is intended to supplement existing hospital emergency plans which frequently lack specific guidance on how to make an evacuation decision, including what factors to consider and for what period of time the decision may be safely postponed. Nor does the Guide recommend best practices “for carrying out an evacuation or for sheltering-in-place during and after a disaster other than to stress the critical need for comprehensive plans for both evacuating patients and for sheltering-in-place” (AHRQ, 2010, p. 1).

There are several helpful tools in the Guide, including a Pre-Disaster Assessment of Critical Infrastructure, that emphasizes critical infrastructure vulnerabilities, such as municipal water, steam, electricity, natural gas, boilers/chillers, powered life support equipment, information technology and telecommunications, and security (AHRQ, 2010). “The focus is on environmental systems (HVAC), water, and electricity because they are critical for hospital operations, and their loss for an extended period invariably triggers a need for evacuation” (AHRQ, 2010, p. 2).

The Guide defines pre-event evacuations as those “undertaken in advance of an impending disaster, when the hospital structure and surrounding environment are not yet

significantly compromised,” and post-event evacuations as those which are “carried out after a disaster has caused substantial damage to a hospital or the surrounding community” (AHRQ, 2010, p. 2). The Guide also discusses in detail the sequence in which patients should be evacuated, suggesting “the most medically fragile and resource-intensive are usually evacuated first, as soon as appropriate transportation and staff are available” (AHRQ, 2010, p. 3). “In cases where all patients are in immediate danger and evacuation must be conducted as quickly as possible, the evidence suggests that the most mobile patients should be evacuated first” (AHRQ, 2010, p. 3).

The Guide also distinguishes between ‘Advanced Warning Events’ and ‘No Advanced Warning Events.’ “With Advanced Warning Events, like hurricanes, decision teams have time prior to the event to make evacuation decisions. With earthquakes and tornadoes—No Advanced Warning Events—decisions must be made quickly, either during the disaster or immediately after” (AHRQ, 2010, p. 6).

The Guide offers decision-making ways to calculate how long a hospital can shelter-in-place if critical infrastructure is damaged. “For example, how long could the hospital maintain a safe temperature without city water during the summer months, and how long could essential power be maintained with only the current on-site fuel supply” (AHRQ, 2010, p. 13)?

Pre- and post-Katrina dialogue on whether it is better to move critically ill patients or not with an impending storm is continuing. According to a story in American Medical News,

Doctors and hospitals are rethinking their approach to moving critically ill patients such as those dependent on ventilators. Pre-Katrina, the rule was to keep these patients in place. That’s because most believed that the danger of moving them could be greater than leaving them in a hospital hit by disaster. But, as hospitals lost power after Katrina, many of these patients had to be ventilated by hand for hours or even days. The sickest did not survive the dehydration caused by days with limited water and no air conditioning (O’Reilly, 2010, ¶ 21).

Therefore, the quandary of whether to move critically ill patients continues to trouble physicians who are responsible for making these decisions.

Dr. James B. Aiken, clinical associate professor of emergency medicine at the LSU School of Medicine “was at New Orleans’ Charity Hospital during the Aug. 29, 2005 hurricane and now is the director of emergency preparedness at the Louisiana State University Health Sciences Center” (O’Reilly, 2010, ¶ 9). “For the patients who are critically ill, the risk of evacuating them, based on what we know now, is worth taking,” Dr. Aiken said. “It’s worth risking their lives to put them through the logistics of evacuation rather than sheltering them in place knowing that once something’s happened, we may not be able to get them out quickly” (O’Reilly, 2010, ¶ 24). Making the decision to evacuate also largely depends on the availability of transportation assets. And not just any transportation assets, but those that are equipped and staffed to handle the special needs of fragile hospital patients who are ill or injured.

An emergency evacuation of special needs populations requires close coordination among the local and state emergency management agencies, federal resources, private organizations (non-government organizations) and transportation agencies. Conveyances used for evacuation include automobiles, buses, trains, boats and even airplanes and helicopters. Each community will have access to specific modes of transportation, and all transportation resources—public, private, and non-governmental—should be considered in evacuation planning and operations. This may include, for example, airport shuttle vans, buses from faith-based organizations, school buses, and paratransit vehicles. In addition, it will be critical to consider specific modes of transportation resources and commitments for use will be highly valuable during an emergency to avoid competition for resources. To do this, emergency managers must bring together first responders, transportation organizations and others that can assist during evacuation (Federal Highway Administration, 2009, p. 3).

When local and regional transportation plans prove inadequate, it may be necessary, as during Katrina, for the federal government to conduct large-scale logistical operations that supplement and, if necessary, replace state and local logistical systems by leveraging resources within both the public sector and the private sector (Townsend, 2006, p. 56).

According to Wolshon et al. (2005),

Development of standards and best practice guidelines are also needed. While it is recognized that evacuation plans need to allow room for flexibility, generic checklists and guidelines could benefit state and local level Department of Transportation and Emergency Management officials in the development of specific plans. They would also ensure a basic level of practice uniformity from location to location, an issue that has gained importance as evacuations become more regionalized (Wolshon et al., 2005, p.140).

Human Resources

The availability and quality of a hospital's human resources are critical anytime, but especially so during disaster or emergency operations. Hospitals need to have a solid team in place that is capable of making and carrying out difficult decisions and tasks in an environment rife with ambiguity. Few would dispute the importance of having strong leadership and a well-designed disaster plan. Having the right number of staff is also critical. There should be not only enough people in diverse areas of specialty to ride out the storm and care for the current patient census but also a similar team of staff to relieve once the emergency has passed. Tulane University Medical Center in New Orleans, as a lesson learned from Katrina, reduced its "patient population and staff on hand to as small as possible. In the run up to Hurricane Gustav, they did this by postponing elective procedures, sheltering-in-place those patients who were too ill to be safely moved and transporting less fragile patients to other facilities during the calm before the storm" (Osterweil, 2008, ¶ 5).

Facilities also need to plan for the effect that traumatic stress can have on its staff. As was learned in the days and weeks following Katrina, "The psychological toll of a disaster to hospital personnel can be significant, and psychological help during the post-disaster period should be provided" (Babar & Rinker, 2006, p. 3).

Communication

Most would agree that lack of communication after Hurricane Katrina was one of the most significant challenges hospitals had to cope with in the storm's aftermath. Emergency planners in healthcare organizations across the country took heed of the communications crisis caused by the flooding in New Orleans post-Katrina.

The second and perhaps most dramatic lesson we learned as a medical institution and as a community was the importance of retaining communication with our local and state authorities, other local health care institutions, our patients and our employees. . . All of the New Orleans hospitals desperately needed to communicate with each other about critical needs for supplies, police or military security, hospital evacuation urgencies or even to tell other hospitals that they had the capacity to take patients and help out their colleagues. This underscored the need for some type of rapid deployment of a military infrastructure with some rapidly deployable fail-safe communication system and a central command structure to deal with police, fire and medical logistical emergencies (Dalovisio, 2006, ¶ 5).

Communication is a key investment area for healthcare organizations seeking to create reliable and redundant capabilities in their facilities. From satellite phones to amateur (HAM) radio operators, hospitals have secured numerous mechanisms to help them to keep in touch with the outside world, including police and fire departments among others. Communications allow for situational awareness during an emergency, assist with command and control functions and contribute to the overall management of the response effort (Babar & Rinker, 2006).

Much has been learned about the life-saving value of communications as a result of the terrorist attacks on the Twin Towers in New York City during 2001, as well during the days after Katrina. As a result, the U.S. government has enacted laws to address this important resource and its availability and organization during emergencies.

Title XVIII of the Homeland Security Act of 2002, as amended, required the Department of Homeland Security's (DHS) Office of Emergency Communications (OEC) to develop a National Emergency Communications Plan (NECP) that provides long- and short-term guidance to address national emergency communications deficiencies. National studies, assessments, and after-action reports from September 11, 2001, Hurricane Katrina, and

other natural and manmade disasters in the last decade have underscored the critical need for improved emergency communications nationwide (DHS & NECP, 2008, ¶ 1).

Therefore, Congress directed the Office of Emergency Communications (OEC) to develop the National Emergency Communications Plan (NECP) in cooperation with a variety of stakeholders, including:

- federal departments and agencies;
- state, local and tribal governments;
- emergency responders;
- and the private sector (DHS, FAQs, n.d., ¶ 3).

The NECP was developed to be consistent with overarching Homeland Security preparedness and response doctrine. This includes the National Response Framework (NRF) and the National Incident Management System (NIMS), the National Preparedness Guidelines and Target Capabilities List, which combine to form a unified structure for response and recovery efforts. The NECP establishes goals, objectives, and initiatives for interoperable and operable emergency communications that will support incident management (DHS, FAQs, n.d., ¶ 19).

“The vision of the NECP is to ensure that emergency response personnel at all levels of government, across disciplines, can communicate as needed, on demand and as authorized. To achieve this vision, the NECP identifies the capabilities and initiatives needed for communications operability, interoperability and continuity of communications for emergency responders nationwide” (DHS & NECP, 2008, ¶ 2).

It is also important to note that the Federal Communications Commission (FCC) has enacted a change in its rules regarding amateur radio operations during a disaster.

Specifically, we amend the rules to permit amateur radio operators to transmit messages, under certain limited circumstances, during either government-sponsored or non-government sponsored emergency and disaster preparedness drills, regardless of whether the operators are employees of entities participating in the drill. Although public safety land mobile radio systems are the primary means of radio-based communications for emergency responders, experience has shown that amateur radio has played an important role in preparation for, during and in the aftermath of, natural and manmade emergencies and disasters (FCC, 2010, ¶ 1).

Local governments and hospitals that have not done so should test and upgrade their

communication systems to the greatest degree possible in conjunction with conducting compatibility checks with state, national and emergency systems (Guin et al., 2009). Ideally, local and state government should develop their communication plan together to ensure consistency with national and emergency organization plans, testing and revising the plan annually, with a backup plan as well (Guin et al., 2009). Communication methods to consider are two-way radios, text messaging capabilities, satellite phones and PDAs (Guin et al., 2009).

Supplies and Pharmaceuticals

“A common thread among hospitals ravaged by Andrew or Katrina is the need to be self-sustaining during a disaster—with enough generator power, water, food and supplies—for much longer than previously thought” (Colias, 2005, ¶ 45). Those hospitals who have experienced directly the effects of a recent hurricane know about the importance of self-sufficiency all too well and are taking steps to become more so as they plan for future hurricane seasons.

Baptist Health South Florida in Coral Gables is working toward a new standard for each of its six hospitals (including Homestead). Seven days of sustainability, up from three days now. CEO Brian Keeley says the Hurricane Katrina disaster reinforced the need to move forward on the plan (Colias, 2005, ¶ 46).

Hospital emergency planning must incorporate detailed preparation regarding supplies and medications that will be needed during a worst case scenario, identifying those which will allow them to be self-sustaining during a catastrophic event (Guin et al., 2009). Additionally, hospitals must consider and plan for a backup communication/transportation strategy to get supplies (Guin et al., 2009). Therefore, many hospitals are contractually pre-arranging with vendors and suppliers to plan ways to get medication and supplies to their medical facilities for patients, first responders, emergency workers, and law enforcement personnel (Guin et al., 2009).

Where pharmaceuticals are specifically concerned, a system called Rx Response has

proven to be a successful way to help to get medicines to facilities that need them most.

Rx Response was created by members of the biopharmaceutical supply system to help ensure the continued flow of medicine to patients following a severe public health emergency. The program's inspiration arose from a key lesson taught by Katrina: the lack of a single point of contact between public health officials and the biopharmaceutical supply system hindered effective communication and coordination. In some cases, shipments of medicine were not allowed past security checkpoints which delayed the availability of medicine for patients. In other instances, efforts by public health officials to learn about the status of medicine shipments and supply required dozens of phone calls to individuals who did not always have the necessary information (Forrer, 2010, ¶ 2).

Another important development in the Katrina-inspired Rx Response Program came during the 2008 hurricane season when Rx Response officials realized after Hurricanes Gustav and Ike how important their status reports detailing which pharmacies had re-opened were to emergency management officials. The new reports gave public health officials the first of its kind status reports about a vital public health asset that had restored its service to the public. The reports also enabled emergency room workers to send people in need of prescriptions to available pharmacies (Forrer, 2010, ¶12).

Fuel and Power

For a number of reasons, it is critically important for hospitals to have access to power during and after a hurricane. Life-saving technology, equipment, heating, and ventilation systems are dependent upon a reliable source of power to run. Many Gulf Coast hospitals have learned just how valuable generators and diesel fuel are in keeping a facility and all of its essential equipment up and running. Consequently, hospitals have spent much effort and resources into locating their generators safely above the flood plain, upgrading their generators and making certain they have adequate fuel to power them (Guin et al., 2009).

Today, hospitals like Tulane University Medical Center in New Orleans, have generators that are either located above flood stage or are housed in watertight casings with enough fuel to last at least one week at full capacity. Robert Lynch, MD, Chief Executive Officer of Tulane University Medical Center explained, "We have enough generator capacity to run everything—air conditioning and all equipment—we can run the operation basically normally and stretch it

out a little further by turning off certain areas of the hospital which we can do with only 400 people” (Osterweil, 2008, ¶ 13).

Medical Records

One lesson learned from Hurricane Katrina was the need to develop an electronic medical record system. Many patients who were transferred to other facilities did not have complete records with them when they arrived, causing an interruption in their care. Also, those ambulatory patients who were able to get to shelters in neighboring cities and states often did not have records regarding their diagnoses or medications, also causing them health-related problems. These problems were particularly severe for cancer patients and others with rare or chronic conditions. As well, stringent policies and laws must be developed to enable appropriate medical personnel to access anyone’s medical information during a disaster, while deterring inappropriate persons from violating privacy policies and laws.

“One clear lesson: the nation urgently needs an electronic patient health record. We want to put in place a system that is responsive to any disaster but also to patients’ daily needs. Patients need a continuity of care record they can carry with them on a diskette” (Eastman, 2006, ¶ 3).

“I’m not sure we would have paid as close attention to medical records had we not experienced evacuees from Katrina,” acknowledged Karen Sexton, then Chief Executive Officer of the University of Texas Medical Branch (UTMB) in Galveston, Texas. UTMB took in 50 to 60 patients displaced from that storm. Some were receiving chemotherapy and radiation treatment, but without records, UTMB physicians had no idea where they were in the cycle” (Weinstock, 2005, ¶ 6).

While experts agreed that a national protocol for automated record-keeping should be

developed, in the meantime, “citizens should be educated to keep copies of prescriptions, insurance and medical information, including maintenance of a copy with someone in another location, especially those individuals with critical medical needs” (Guin et al., 2009, pp. 103-104).

CHAPTER 3.

METHOD

The purpose of the research study was to review the experiences of nine Gulf Coast hospitals located in Louisiana, Mississippi and Texas and to determine how they are managing crisis preparedness in their institutions, what they have learned since Hurricane Katrina and other significant storms, and ways they are applying that knowledge. Their lessons learned have the ability to inform healthcare providers nationally and internationally as institutions craft emergency preparedness plans in efforts to be ready when the next crisis strikes. This study sought to share what strategies worked, as well as those that may need modification, in terms of specific response to recent Gulf Coast storms. In addition, this study explored new, untested strategies now being considered or implemented by hospitals to increase organizational effectiveness in maintaining critical, life-sustaining patient care. The study attempted to answer the following question:

What strategies are hospitals in coastal Louisiana, Mississippi and Texas using in their emergency preparedness plans five years since Hurricanes Katrina and Rita to facilitate their ability to respond more effectively under crisis conditions and to maintain critical patient care operations?

Qualitative Research Design

This study was a qualitative research design. A major feature of this type of research design is that it was focused “on naturally occurring, ordinary events in natural settings, enabling the researcher to vividly describe what ‘real life’ is like in that particular setting”—a hospital managing in crisis circumstances, for instance (Miles & Huberman, 1994, p. 10). The fact that data collection took place in the natural setting also contributed to the groundedness of the information.

Qualitative methods consist of three kinds of data collection: (1) in-depth, open-ended interviews; (2) direct observation; and (3) written documents. The data from the interviews consist of direct quotations from people about their experiences, opinions, feelings, and knowledge. The data from observations consist of detailed descriptions of people's activities, behaviors, actions, and the full range of interpersonal interactions and organizational processes that are part of observable human experience. Document analysis in qualitative inquiry yields excerpts, quotations, or entire passages from organizational, clinical, or program records; memoranda and correspondence; official publications and reports; personal diaries; and open-ended written responses to questionnaires and surveys (Patton, 1990, p. 10).

Through interviews and continuing dialogue with the participants in their home settings, as opposed to a mail or phone survey, the researcher solicited the participants' specific knowledge, perspectives and interpretation of the phenomenon of study.

Aside from studying real-world situations in their native environments, qualitative analysis is characterized by embracing a holistic perspective—attempting to understand the entire phenomenon as a complex system that is more than the sum of its parts (Patton, 1990). Additionally, qualitative analysis yields detailed, thick descriptions that capture personal points of view and experiences (Patton, 1990). Working in the field, obtaining firsthand accounts in informal conversations and formal interviews provides a level of personal contact and insight for the researcher which results in a greater understanding of the phenomenon under study (Patton, 1990).

The ability to discover and apply this “richness and holism” to complex subject matter—e.g., conducting emergency operations in healthcare facilities—provided a clearer understanding of decisions made during times of crisis, including which processes were implemented and why they were implemented. Qualitative data allowed the researcher to go beyond providing merely a snapshot of a situation. Rather, the data allowed the researcher to impart a deeper, clearer understanding of what actually took place and what decisions were made and acted upon in a hospital during a weather-related emergency or other crisis (Miles & Huberman, 1994).

Phenomenological Approach to Data Collection and Analysis

This study was a qualitative research study using the phenomenological lens and the modified van Kaam (Moustakas, 1994) method of analyzing phenomenological data.

“Phenomenological research is a strategy of inquiry in which the researcher identifies the essence of human experiences about a phenomenon as described by participants” (Creswell, 2009, p. 13). “Understanding the lived experiences marks phenomenology as a philosophy as well as a method, and the procedure involves studying a small number of subjects through extensive and prolonged engagement to develop patterns and relationships of meaning” (Moustakas, 1994, as cited by Creswell, 2009, p. 13).

As a research philosophy, phenomenology focuses on the essence of lived experience (Rossman & Rallis, 2003). “Those engaged in phenomenological research focus in-depth on the meaning of a particular aspect of experience, assuming that through dialogue and reflection the quintessential meaning of the experience will be reviewed” (Rossman & Rallis, 2003, p. 97). Patton (1990) also described a phenomenological study as “one that focuses on descriptions of what people experience and how it is that they experience what they experience” (p.71).

The theoretical groundings for phenomenology are rooted in the beliefs of Descartes, who “doubted the reality of external perceptions based solely on studies of bodies in space, and thus recognized that knowledge also emerged from self-evidence,” and Immanuel Kant, who believed that “knowledge of objects resides in the subjective sources of the self” (Moustakas, 1994, pp. 43-44). These kinds of ideas led the way for the development of phenomenology by the German philosopher, Edmund H. Husserl (1859-1938) (Patton, 1990, p. 69). Husserl sought to develop “a rigorous science based on philosophy, sound perceptions, ideas, and judgments” (Moustakas, 1994, p. 45). Husserl’s “most basic philosophical assumption was that we can only

know what we experience by attending to perceptions and meanings that awaken our conscious awareness. Initially, all our understanding comes from sensory experience of phenomena, but that experience must be described, explicated and interpreted” (Patton, 1990, p. 69). Husserl’s phenomenology “emphasizes subjectivity and discovery of the essences of experience and provides a systematic and disciplined methodology” for discovering knowledge. (Moustakas, 1994, p. 45).

Through dialogue and reflection, the researcher described the “lived experiences” of selected hospital administrative decision-makers and support staff, relative to preparations made before, during and after Hurricanes Katrina, Rita and other significant storms.

Phenomenology was well suited for this study, as the researcher desired to gather participants’ comprehensive descriptions from their individual, real-world experiences. The researcher illustrated commonalities among the participants’ experiences in regard to the phenomenon, with the goal of reducing their unique experiences to a summation of their quintessential essence (Rossman & Rallis, 2003).

According to Moustakas (1994), a phenomenological inquiry involves several steps, primarily “Epoche” and “Phenomenological Reduction.” In the Epoche, we “set aside our prejudgments, biases and preconceived ideas about things” (Moustakas, 1994, p. 85). Moustakas (1994) saw it as a “preparation for deriving new knowledge but also as an experience in itself, a process of setting aside predilections, prejudices, predispositions, and allowing things, events, and people to enter anew into consciousness and to look and see them again, as if for the first time” (p. 85).

The steps of Phenomenological Reduction include: Bracketing, in which the focus of the research is placed in brackets, everything else is set aside so that the entire research process is rooted solely on the topic and question; horizonalizing, every statement initially is treated as having equal value. Later, statements irrelevant to the topic and

question as well as those that are repetitive or overlapping are deleted, leaving only the Horizons (the textural meanings and invariant constituents of the phenomenon); Clustering the Horizons Into Themes; and Organizing the Horizons and Themes Into a Coherent Textural Description of the phenomenon. (Moustakas, 1994, p. 97)

To expound, invariant constituents “point to the unique qualities of an experience, those that stand out” (Anastoos, 1987, p.141, as cited by Moustakas, 1994, p. 128). Individual textural descriptions are “vivid descriptions of the experience” and individual structural descriptions “provide a vivid account for the underlying dynamics of the experience” (Anastoos, 1987, as cited by Moustakas, 1994, p. 128). “The structures are brought into the researcher’s awareness through imaginative variation, reflection and analysis, beyond the appearance and into the real meanings or essences of the experience” (Copen, 1993, p. 65, as cited by Moustakas, 1994, p. 135).

Through this study, the researcher strove to experience epoche in advance of conducting interviews with study participants. Phenomenological reduction occurred once interview transcripts were available and as the study was unfolding.

Moustakas, in citing principles of “transcendental phenomenology,” described the investigator as having a “personal interest” in the entities under investigation, providing an autobiographical aspect to the study (Moustakas, 1994, as cited by Tashakkori & Teddlie, 2009, p. 255). This aspect was a fitting description of the researcher for this study, who worked in a hospital setting for 16 years and was, therefore, familiar with basic hospital operations, administration and policy, as well as implementing crisis command operations in a medical facility.

Reliability and Validity

“Without rigor, research is worthless, becomes fiction, and loses its utility. Hence, a great deal of attention is applied to reliability and validity in all research methods”

(Morse et al., 2002, p. 1). Scholars have developed thorough, comprehensive standards for demonstrating the rigor, authenticity and trustworthiness of qualitative research. “In an ever-increasing number of textbooks, guidelines for qualitative researchers recommend rigor in sampling, data collection, and analysis; triangulation of data sources, methods investigators, and theories; the need to search for negative cases; and the use of ‘thick description’ (Geertz, 1973, as cited by Pyett, 2003, p. 1171) and detailed reporting as we document our accounts. Qualitative researchers also need to heed and adopt policies of openness, honesty and reflexivity” (Hagey, 1997; Marshall, 1990; as cited by Pyett, 2003, p. 1171).

Acknowledging the differences between qualitative and quantitative inquiry, Guba and Lincoln (1981) substituted for reliability and validity the corresponding term “trustworthiness,” composed of four key components: credibility, transferability, dependability and confirmability (Morse et al., 2002, p. 1).

Credibility involves establishing that the qualitative research results are credible. Transferability is defined as the “degree to which the results of qualitative research can be generalized or transferred to other contexts or settings” (<http://www.socialresearchmethods.net/kb/qualval.php>). Dependability is concerned with the researcher accounting for changes that occur in the research setting and how those changes affect the way the researcher approaches the study. Confirmability refers to the degree to which the results of the study can be confirmed by others (<http://www.socialresearchmethods.net/kb/qualval.php>). Within each of these components are “specific methodological strategies for demonstrating qualitative rigor, such as the audit trail, member checks when coding, categorizing, or confirming results with participants, peer debriefing, negative case analysis, structural corroboration, and referential material adequacy” (Morse et al., 2002, p. 1).

According to Patton (1990), the credibility issue for qualitative inquiry depends on three distinct but related inquiry elements:

1. rigorous techniques and methods for gathering high-quality data that is carefully analyzed, with attention to issues of validity, reliability and triangulation;
2. the credibility of the researcher, which is dependent on training, experience, track record, status, and presentation of self; and
3. philosophical belief in the phenomenological paradigm, that is, a fundamental appreciation of naturalistic inquiry, qualitative methods, inductive analysis, and holistic thinking (Patton, 1990, p. 461).

“The qualitative researcher has an obligation to be methodical in reporting sufficient details of data collection and the processes of analysis to permit others to judge the quality of the resulting product” (Patton, 1990, p. 462). In analyzing data, the qualitative researcher must continually examine and check his or her work again and again, evaluating the way he or she is interpreting and explaining the data, taking into consideration the academic literature as well as the nuances of the particular population being studied; consistently review the method of analysis for technical and intellectual rigor; and enlist the help of outside stakeholders who can provide an unbiased viewpoint (Pyett, 2003).

This researcher used triangulation, participant validation and peer debriefing to provide additional credibility and dependability for the study at hand. “By combining multiple observers, theories, methods and data sources,” researchers can attempt to “overcome the intrinsic bias that comes from single-method, single-observer, and single-theory studies” (Denzin, 1989, p. 307). This researcher used triangulation of data sources, “comparing and cross-checking the consistency of information derived at different times and by different means within qualitative methods” (Patton, 1990, p. 467). To ensure additional technical rigor and convergence of information, the researcher utilized the strategy of having independent analysts review the same qualitative data, comparing their findings as well as asking informants to

provide feedback on whether conclusions are accurate (Creswell, 1994).

Finally, according to Patton (1990), “Because the researcher is the instrument in qualitative inquiry, a qualitative report must include information about the researcher” (p. 472). Patton asked, “What experience, training and perspective does the researcher bring to the field? What personal connections does the researcher have to the people, program, or topic studied?” (p. 472).

The Researcher’s Lens

“Qualitative research depends, at every stage, and particularly for its validity (Reason, 1981, as cited by Pyett, 2003, p. 1172), on the skills, training, insights, and capabilities of the researcher” (Patton, 1990, as cited by Pyett, 2003, p. 1172). “For better or worse, the trustworthiness of the data is tied directly to the trustworthiness of the evaluator who collects and analyzes the data” (Patton, 1990, p. 476).

“Because the researcher is the instrument in qualitative inquiry, a qualitative report must include information about the researcher” (Patton, 1990, p. 472). Therefore, what experience and training does the researcher bring to the study? How is the researcher personally or professionally connected to the research question being studied? (Patton, 1990)

This researcher’s professional training is in the field of communications, public relations and marketing as well as in business administration, with the first 16 years of her career spent working in hospital administration. Specifically, the researcher’s hospital experience included work at a small, for-profit suburban facility; a large, urban, religious-affiliated facility; and a governmental, mid-sized, suburban, acute care facility. As a result, the researcher is familiar with the many complex challenges related to providing high-quality healthcare to a community. The researcher’s years of experience working in healthcare administration as a member of the

executive team, helping to recruit and establish new physicians, assisting in the start-up and marketing of new services and facilities, managing and being held accountable for budgets, contributing to the creation of strategic plans, monitoring patient satisfaction, handling media relations and spokesperson duties, engaging in and actively participating in community activities and serving on community boards—all combined to help establish trust, confidence and credibility between this researcher and study participants. The researcher also has experience in managing organizational planning and response to crisis gained through her career in the healthcare field by riding out storms such as Hurricane Andrew, in a hospital (1992); as well as more recent experiences working in communications in a four-year research university with 28,000 plus students. This experience includes managing the university's communication response to Hurricanes Katrina, Rita and Gustav.

In addressing the generalization of the results of this specific naturalistic study, this researcher agrees with two viewpoints as stated by Guba (1978) and Cronbach et al., (1980), as cited by Patton, 1990.

Guba (1978: 70) proposed that “the evaluator should do what he can to establish the generalizability of his findings. . . .Often naturalistic inquiry can establish at least the ‘limiting cases’ relevant to a given situation. But in the spirit of naturalistic inquiry, he should regard each possible generalization only as a working hypothesis, to be tested again in the next encounter and again in the encounter after that. For the naturalistic inquiry evaluator, premature closure is a cardinal sin, and tolerance of ambiguity a virtue” (Patton, 1990, p. 488).

The view of Cronbach et al. (1980: 231-35 as cited by Patton, 1990) toward generalizability is in the spirit of putting research results to good use following the completion of a study. Cronbach et al. preferred use of the term “extrapolation” rather than “generalization.” Cronbach et al. “argue against experimental designs that are so focused on carefully controlling cause and effect that the findings are largely irrelevant beyond that highly controlled

experimental situation. On the other hand, they are equally concerned about entirely idiosyncratic case studies that yield little of use beyond the case study setting (Cronbach et al., 1980: 231-35, as cited by Patton, 1990, p. 489). “Extrapolations are logical, thoughtful and problem oriented rather than statistical and probabilistic” (Patton, 1990, p. 489). It is the hope of this researcher that stakeholders in the healthcare arena are able to apply logically some of the information, knowledge and insight “extrapolated” from this study.

Population and Sample of the Study

The sampling strategy used for this research study was purposive. Purposive sampling techniques involve selecting certain units or cases “based on a specific purpose rather than randomly” (Tashakkori, & Teddlie, as cited by Tashakkori & Teddlie, p. 173).

In this study, the researcher used a number of criteria in selecting a small, but representative, group of participants. “Qualitative researchers usually work with small samples of people nested in their context and studied in depth” (Miles & Huberman, 1994, p. 27). Because the depth, breadth and richness of information these participants provided was so critical to the study, selection criteria were exceptionally important. The quality of the research participant and his or her contribution to the study was of greater importance and relevance than the quantity of research participants (Miles & Huberman, 1994).

This researcher used purposive, multiple-case sampling techniques to choose an appropriate participant panel. “Multiple case sampling adds confidence to findings. By looking at a range of similar and contrasting cases, we can understand a single-case finding, grounding it by specifying how and where, and if possible, why it carries on as it does” (Miles & Huberman, 1994, p. 29). In addition to selecting a group of “typical cases,” hospitals representative of the types, sizes and locations of facilities, the researcher also deliberately sampled “extreme or

deviant cases,” e.g., facilities that experienced significant flooding and loss of running water and utilities, as well as one institution that completed a full-blown, total patient evacuation prior to a hurricane’s landfall. An additional “reputational case selection” interview participant included a high-ranking healthcare association executive (Goetz & Lecompte, 1984, as cited by Miles & Huberman, 1994, p. 28).

All hospitals were located on the Gulf Coast of Louisiana, Mississippi and Texas. Hospitals were selected to represent each of the three coastal states. Selected facilities were a mixture of large and small (based on bed size), community or tertiary, urban and suburban, teaching and non-teaching, profit (proprietary) and not-for-profit (governmental, private or religious). The researcher selected individuals from each institution, typically the chief executive officer and either the director of emergency preparedness/facility director or chief nursing officer or their equivalent, each of whom represented and had knowledge of the research topic.

The researcher interviewed the chief executive officer (or equivalent) for that individual’s ability to provide a broad overview of the hospital’s experience and preparation pre- and post-Hurricanes Katrina, Rita, Gustav and Ike. The researcher selected and interviewed hospital emergency preparedness directors, chief nursing officers or their equivalents to provide a more well-rounded view of their experiences in addition to obtaining their critical observations regarding plans, policies and procedures relevant to preparing their specific institution for emergencies and crisis. The researcher specifically interviewed these two types of individuals to contrast decision-makers who served as incident commanders in their facilities to those primarily responsible for handling logistical duties.

The researcher, through previous experience in the field, had former colleagues who were

instrumental in helping her select and contact individuals for the study. Research participants were solicited by phone and electronic mail to request their participation. The researcher selected participants based on their having worked during one or more hurricanes at their respective institutions within the past five years. This allowed for optimum sharing of rich, vivid pre- and post-Katrina experiences, of the extreme circumstances in which they found themselves, and of the unique operational challenges they faced.

Data Collection

This study consisted of informal, one-time, face-to-face, semi-structured interviews to obtain narrative, digitally-recorded “lived experiences” related to participants’ pre- and post-Katrina experiences and views.

The subject pool consisted of representatives from nine hospitals in Louisiana, Mississippi and Texas, and included chief executive officers (or their equivalent), who provided top management’s perspective, as well as institutional emergency preparedness managers/facility director (or their equivalent) to supply a “front-line” viewpoint. The researcher also interviewed a high-ranking healthcare association executive who had significant experience in managing and leading healthcare facilities as well as assisting hospitals’ statewide response to a hurricane emergency. A purposive sampling strategy was used, with each interview participant having worked during one or more hurricanes during the past five years. This ensured that the participants had relevant, information-rich experiences for the purpose of this study.

The researcher arranged to meet with each participant for a period of approximately one hour at his or her office in his or her respective facility. Each participant was asked to read and sign a consent form. The Internal Review Board (IRB) of Louisiana State University granted approval to conduct this study, with the understanding that the study was voluntary and with

participants having the ability to discontinue their participation in the study or ask that their interview be withdrawn at any time (LSU IRB # E5086). The researcher explained the confidentiality of information to each participant, making each aware that neither their name nor the name of their institution would appear in the researcher's dissertation.

Prior to each interview, the researcher sent via electronic mail the research proposal and the conceptual framework of the study. The researcher verbally confirmed the informed consent of each participant regarding participation and the digital recording of the meeting. Once the researcher obtained informed consent, the researcher proceeded with meeting the participant and conducting the interview, soliciting verbal responses to a pre-designed set of questions. The researcher took detailed field notes both as the interview was progressing, as well as after the interview was concluded, noting particulars about the setting, body language of the participant and other pertinent facts and information. When the interview was complete, the researcher requested that the participant send to the researcher any pertinent hospital emergency plans, policies, procedures, organizational charts, photographs, videos, demographic information or other related media that will further support this study. A transcriptionist transcribed the digital audio files of each interview according to guidelines established by Louisiana State University's IRB. The researcher sent each participant their respective transcript for review and debriefing and allowed the opportunity to correct the transcripts for accuracy.

The interview process continued until saturation was achieved and the researcher was satisfied that data collection was complete. "Data saturation entails bringing new participants continually into the study until the data set is complete, as indicated by data replication or redundancy. In other words, saturation is reached when the researcher gathers data to the point of diminishing returns, when nothing new is being added (Bowen, 2008, p. 140). "For their part,

Morse et al. (2002, p. 12) pointed to the purpose of data saturation: ‘Saturating data ensures replication in categories; replication verifies, and ensures comprehension and completeness’” (Bowen, 2008, p. 140).

In addition to data collected primarily through interviews, the researcher also relied on information obtained through an exhaustive review of the literature regarding pre- and post-Katrina emergency planning and lessons learned in hospitals on the Gulf Coast.

Interview questions were determined based on a conceptual framework prepared by the researcher. Each of the interview questions was supportive of informing the framework in a meaningful way.

Conceptual Framework

The conceptual framework (p. 56) identified the primary categories of focus in the study. The researcher chose representative hospitals and identified study participants from each of the respective facilities. Interviews concentrated on discussions of emergency policies and procedures (including evacuation and sheltering-in-place), reviewing critical experiences, lessons learned and major innovations adopted. The researcher also questioned participants regarding management of human resources and investment in preparedness equipment and supplies. Facilities’ commitment to providing training and practice drills was discussed, as well as how hospitals evaluate and improve their performance following weather-related emergency events. This evaluation process, as indicated by the series of arrows in the framework, served to inform hospitals of future plans, policies and procedures, investments in capital and human resources as well as potential modifications to and frequency of training and drills.

The conceptual framework represented the many and varied aspects of hospital emergency planning and the complexities of their interrelation.

Conceptual Framework for a Study of Emergency Preparedness in Hospitals Located on the U.S. Gulf Coast

EXPLANATION OF CATEGORIES

Hospital Characteristics

- Facility size and type (acuity level)
- Service area demographics
- Major health services provided

Policymakers/Planners

- Perceptions of readiness post-Katrina
- Critical experiences, lessons learned
- Major changes/innovations adopted

Plans, Policies & Procedures

- Katrina's impact on plans, policies, procedures

Capital Investment

- Communication devices
- Physical plant improvements/modifications
- Other protective equipment/supplies

Human Resources

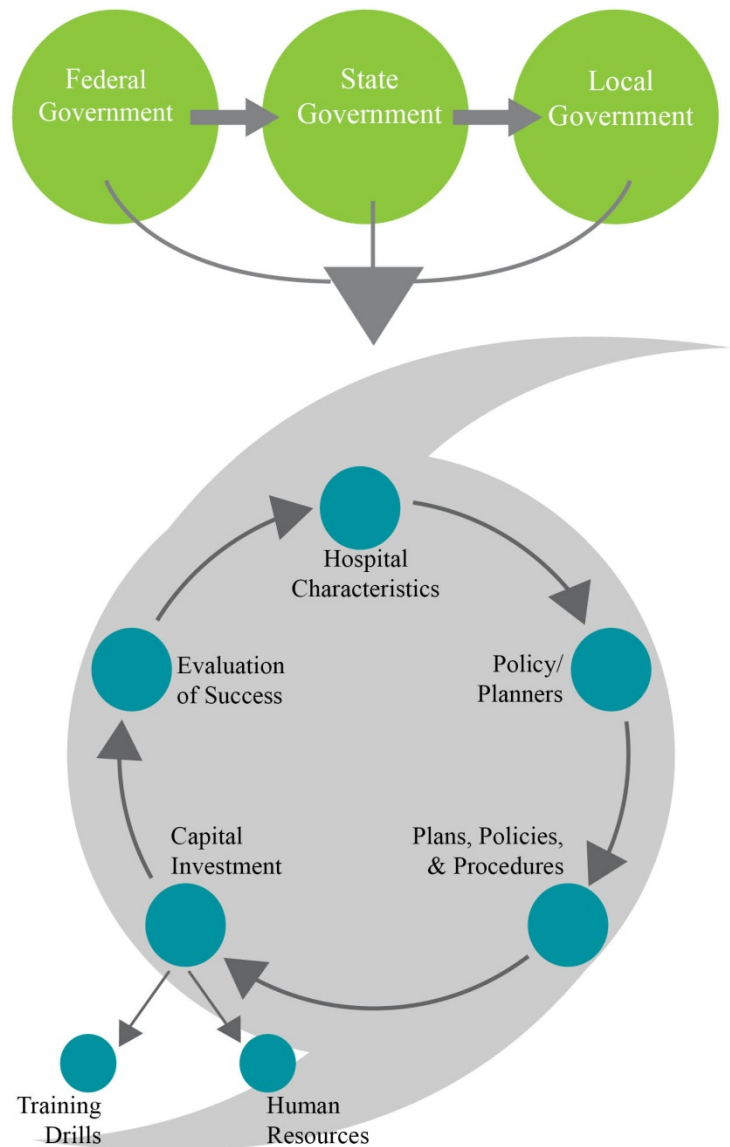
- Additions
- Reassignment of job duties
- Lines of authority

Training/Drills

- Training schedules
- Manual updates & changes

Evaluation of Success

- Quality/ease of plan implementation
- Nature/extent of changes in preparedness
- Quality/frequency of drills/staff familiarity with the plan



Interview Questions

A list of questions for interview participants follows:

Plans, Policies & Procedures

- What is your plan for protecting your facilities, infrastructure, personnel and patients?
What are the major differences pre- and post-Katrina?
- Is there anything you have done at your facility that you feel is unique or makes your organization more progressive in its approach to emergency preparedness as compared to other hospitals—whether they are larger or smaller?

- What is your plan for recovering from incidents that impact your facilities, infrastructure, personnel and patients? How are these current plans different from those pre-Katrina?
- What special emergency response resources have you planned for in the past? As a result of Hurricanes Katrina, Rita and Gustav, what special resources do you anticipate needing in the future?
- Has your facility adopted NIMS (National Incident Management System) as its official incident response system? My understanding is that this is required of all facilities wishing to be reimbursed with FEMA funds. Is this correct?
- Have you directed/mandated managers within your facility to train, exercise and use the incident command system (ICS)? Are employees held accountable for learning ICS and taking online training and examinations?
- Have you fully integrated ICS into functional and system-wide emergency operations, policies, plans and procedures?
- What actions have you taken to ensure everyone in your organization knows the plan(s)? Are these actions different from what you were doing pre-Katrina? If so, how?
- What processes do you have in place to develop, approve and maintain hospital emergency plans for each of your departments?
- What actions have you taken to ensure your plan is current and tested on a regular basis? Do you have after-action processes following an emergency that allow you to incorporate lessons learned into your existing plans?
- What procedures are in place to update plans? How often do you review plans?
- Do you have the ability to preserve emergency operating records as well as legal and financial records?
- Do you have a specific evacuation plan?
- Does this plan address how the evacuation message will be communicated?
- Does your plan address provision of transportation and take into account potential fuel shortages? What about Medical Institution Evacuation Plan (MIEP)?
- Does your plan address special needs populations? Dialysis?
- Who has the authority to implement an evacuation?

- Do staff have pre-disaster guidance/plans on sheltering in-place versus evacuating?
- Has the economy taken a toll on how much you are able to spend to prepare for emergencies? Are you postponing any aspect of your plan due to difficulties related to a poor economy?

Relationships and Mutual Aid

- Does your organization work closely with governmental units to obtain assistance and keep communication lines open? How close is your relationship to other hospitals in the area, hospital association, local government and law enforcement, churches? Would you say your relationships with external agencies are much better now than they were before Katrina? Worse? About the same?
- Do you have any mutual assistance agreements in force now for a future emergency? What are those agreements? Food, fuel, water, supplies, pharmaceuticals, staffing/volunteers, etc. Were these agreements in place pre-Katrina or are these agreements in place as a result of that experience?

Preparation

- What are some of the most significant protective actions you have put into place since Katrina or considered for the future? What specific actions have you taken to do so? For example, installed water tanks, purchased generators, etc.
- What factors determine which protective actions are to be implemented?
- How do you prioritize your crisis preparation activities?
- Who makes the decisions to implement additional protection measures?
- What are your biggest risks? What keeps you awake at night?

Human Resource Management

- How are you organized for a catastrophic incident response along the lines of another Hurricane Katrina?
- Who works together to specify your organization's critical organizational infrastructure? What major differences, if any, exist in your organization chart under normal operations versus crisis operations?
- Which staff members are essential to your operation? Who is expected to report to work during an emergency? Why? Are these key staff members aware of their roles? Is there redundancy of their positions?

- Who is responsible for identifying potential threats/risks in your facility?
- Has your facility provided for the orderly process of succession for senior management during an emergency in the event individuals are unavailable to execute their duties? How deep are these plans?
- Do you feel that all of your essential personnel are adequately trained and cross-trained to perform all essential functions?
- Have you considered the impact of absenteeism/personnel shortages on your ability to continue operations?
- Have you considered the role of volunteers in maintaining continuity of operations? What is your plan for handling credentialing issues?
- Do your plans address staff fatigue and stressful working conditions? How do you handle this?

Communication

- Do you have internal and external communication capabilities to support essential functions? Do these capabilities enable you to communicate internally and externally and provide you access to data, systems and services? What types of communication will you primarily rely on?
- Do you have redundant communication systems? For what period of time are they sustainable?
- What is the potential for a catastrophic-level event in your community?

Miscellaneous

- Overall, how robust are your response capabilities? Are you better prepared now than you were five years ago?
- What are your biggest shortfalls, weaknesses? What are you doing to address those shortfalls?
- Who makes the decision as to what actions will be implemented? Has this changed since Katrina?
- How involved is the board and/or the medical staff in your crisis preparedness planning? How are they kept apprised of your plans and their roles?

Analyzing the Data

“Analyzing and interpreting qualitative data entails fully knowing the data (immersion), organizing these data into chunks (analysis), and bringing meaning to those chunks (interpretation)” (Rossman & Rallis, 2003, p. 270). The researcher carefully evaluated the interview transcripts and other supporting data collected during the course of the study according to the modified van Kaam (1959, 1966) method of analyzing phenomenological data. Using the complete transcription of each research participant:

1. Listing and grouping of each relevant experience (Horizontalization).
2. Reduction and Elimination: To determine the “Invariant Constituents,” look to maintain those experiences that are necessary for understanding the phenomenon while removing those irrelevant, overlapping, repetitive or vague experiences. The “horizons” that remain become the invariant constituents of the phenomenon or experience.
3. Clustering and Thematizing the Invariant Constituents: Cluster the invariant constituents of the experience that are related into a thematic label or category. The clustered and labeled constituents become the core themes of the experience or phenomenon.
4. Final Identification of the Invariant Constituents and Themes by Application: Validation: Check the invariant constituents and their accompanying theme against the complete record of each research participant. (1) Are they expressed explicitly in the complete transcription? (2) Are they compatible if not explicitly expressed? (3) If they are not explicit or compatible, they are not relevant to the co-researcher’s experience and should be deleted.
5. Using the relevant, validated invariant constituents and themes, construct for each co-researcher an Individual Textural Description of the experience or phenomenon. Include verbatim examples from the transcribed interview.
6. Construct for each co-researcher an Individual Structural Description of the experience based on the Individual Textural Description and Imaginative Variation.
7. Construct for each research participant a Textural-Structural Description of the meanings and essences of the experience or phenomenon, incorporating the invariant constituents and themes. From the Individual Textural-Structural Descriptions, develop a Composite Description of the meanings and essences of the experience or phenomenon, representing the group as a whole (Moustakas, 1994, pp. 120-121).

This researcher constructed a thick, information-rich description of the research topic, including how and why events occurred, as well as an accounting of research participants’

attitudes and experiences (Bowen, 2008, p. 149).

As mentioned previously, there were strategies to ensure credibility and rigor of the data analysis, including triangulation, prolonged engagement, participant validation, the assistance of a peer debriefer and drawing upon the community of practice (Rossman & Rallis, 2003, p. 69). Employing triangulation, the researcher used multiple data sources, including transcripts and field notes, as well as information obtained in the review of literature, to ensure completeness of data available for analysis. Additionally, the researcher utilized the experienced knowledge of a current hospital chief executive officer, who was not a part of the participant pool, to assist with data analysis, provide an unbiased external perspective, point out omissions or inconsistencies, as well as offer recommendations to strengthen the study's value and to ensure its clarity and credibility.

Prolonged engagement occurred naturally through the interview process, which allowed for extended contact with interview participants in their respective hospital setting. The researcher sought to obtain additional knowledge of the respective facilities through tours, photos, books and other means.

Peer debriefing is defined as a process of “exposing oneself to a disinterested peer in a manner paralleling an analytical session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind” (Lincoln & Guba, 1985, p. 308). Another definition of peer debriefing is as follows:

In peer debriefing, researchers meet with one or more impartial colleagues in order to critically review the implementation and evolution of their research methods. The role of the peer debriefer is to facilitate the researcher's consideration of methodological activities and provide feedback concerning the accuracy and completeness of the researcher's data collection and data analysis procedures (Spillet, 2003, p. 3).

Krisanna Machtmes, Ph.D., served as the peer debriefer for this study.

Limitations of the Study

There were limitations in the study that had an impact on its conclusions and the ability to generalize the results.

To begin, this was a regional analysis with a small sample of hospitals in a specific area (U.S. Gulf Coast) of the country, about a very specific phenomenon. This may influence the external validity of the results.

The researcher did not conduct a pilot test of the Interview Questions, but did have the questionnaire reviewed by her community of practice, which included three registered nurses and a hospital administrator. The researcher relied on their guidance to ensure appropriate scope and focus.

CHAPTER 4.

ORGANIZING, ANALYZING AND SYNTHESIZING DATA

This chapter describes how the researcher organized, analyzed and synthesized the data according to the modified van Kaam method (Moustakas, 1994). Data are reported in the following order: horizontalization, meaning units, themes, and a composite textural-structural description.

Horizontalization

The process of horizontalization of the data entailed careful review of the verbatim transcripts by the researcher, peer debriefer, two research participants, and members of the researcher's community of practice, known as triangulating analysis. The researcher sent each participant a copy of their interview transcript via electronic mail. Participants did not make any corrections or additions to their transcripts when given the opportunity to review them, therefore their comments were considered to be valid descriptions and representative of the true essence of their experiences. The peer debriefer met regularly with the researcher to validate the data analysis process. The peer debriefer and researcher read each verbatim transcript to understand each respondent's experience. Additionally, the researcher reread each transcript during periods of reflection, practicing epoche as she read each respondent's comments, enabling her to more completely understand their experience. This process provided the researcher with heightened familiarity of every statement of each respective transcript and assisted in data organization (Hathorne, 2006).

Identifying the Meaning Units

The researcher identified meaning units from the participant's responses to the Interview Questions. To begin, the researcher organized the meaning units from each transcript, then

clustered all of the respondent's meaning units according to each question asked. The researcher weighted pertinent statements equally in importance to create the horizons or invariant constituents referred to as meaning units (Hathorne, 2006).

The following pages of narrative contain the meaning units in the order of the Interview Questions. The meaning units are the respondents' verbatim responses with extraneous text removed. The researcher was meticulous in presenting the parts of the transcript that were relevant to the topic and avoided taking any statements out of context. Table 1 below is a legend indicating the types of hospitals represented by the respondents.

Table 1: Hospital Characteristics

<u>Respondent</u>	<u>Hospital Location</u>	<u>Ownership</u>	<u>Type</u>	<u>Beds</u>	<u>Classification</u>
Respondents 1 & 2	Suburban	County	Not-for-profit	185	General Acute Care
Respondents 3 & 4	Suburban	County	Not-for-profit	104	General Acute Care
Respondents 5 & 6	Suburban	County	Not-for-profit	440	General Acute Care
Respondent 7	NA	NA	NA	NA	NA
Respondent 8	Suburban	Corporate	For-profit	580	General Acute Care
Respondent 9	Urban	State	Not-for-profit	570	Tertiary Care, Teaching
Respondent 9	Urban	State	Not-for-profit	255	Tertiary Care, Teaching
Respondent 10	Urban	Corporate	For-Profit	235	Tertiary Care, Teaching
Respondent 10	Urban	Federal	Not-for-profit	492	Tertiary Care, Teaching
Respondent 11	NA	Corporate	For-Profit	NA	NA
Respondents 12, 13 & 14	Urban	State	Not-for-profit	800	Tertiary Care, Teaching

*Note: In the following section "Meaning Units," "XXXX" denotes names or specific places that have been designated as such in order to preserve confidentiality and anonymity of the research respondents.

Meaning Units

- **Meaning Unit # 1: What is your perception of your facility's preparedness plan? Pre- and post-Katrina?**

Respondent 1, Facility 1:

“I was here pre-Katrina and post. I really don't feel like Katrina changed our internal plan and what we're doing now.”

Respondent 2, Facility 1:

“Our plan is based on an old plan. It has existed for a number of years and that has been updated and improved over time based on our experience with four or five hurricanes and other storms that have threatened us. Most of our planning is around hurricanes, although the plan applies to other disasters. Our main purpose is to serve the people that live and reside in this area, or who may be in this area during such a disaster, and to provide care continuously at the highest level we possibly can under those circumstances. So that involves a physical plant that works, that functions. And so what we've done over the years is add generator sets...the original part of the hospital is all wired...for example the generators power everything...for patient care purposes, for other support services. All electrical systems work as if they were powered from the original source. We have also done more training...we have improved the communication systems dramatically. We have, within departments of the hospital and certain services, improved our ability to relate to external vendors, such as those people...those individuals. . .those companies that provide food, pharmaceuticals, whatever it may be.”

Respondent 4, Facility 2:

“...I've always felt that we had a pretty viable emergency preparedness plan...back in 2005, we thought we were as prepared as we needed to be. We do a hazard vulnerability analysis every year. We look at all the reasonable scenarios or what we think are reasonable

...the one issue that we never really gave a lot of consideration to was flooding. We are in the highest point in town, we are about 21 feet above sea level and it never flooded here before. So that wasn't anything that we really put a lot of, really not much thought at all into...we certainly couldn't have prevented what happened, but we could have salvaged a lot more equipment, probably and lessened the damage had we anticipated, hey, we can take water out here. We probably certainly could have come up with a little better internal planning at least to salvage a little more of what we had."

Respondent 8, Facility 4:

"That was a very hard thing [not being able to take in other patients] because we could not deal with anymore. We did have, if I can remember correctly, there was a little lady, older lady, probably in her 80s I would guess, and her husband walking. They were being pushed by two men...whether they were sons or not, I'm not sure...like in a bathtub, and the little lady had a stroke apparently. So we did take the husband and the lady in the hospital...the other ones, whoever came with them, we did not, because we just could not have any other people go in there. It's just too unsecure. We didn't know what was going on, we had no idea who these people were or what they had, so, at that point, we had to protect the people that were there."

Respondent 9, Facilities 5 and 6:

"Well, fortunately XXXX and the people that were, you know, myself included, that were in charge of facilities and emergency management at that particular time, took that somewhat to heart and understood that both the XXXX campus and the XXXX campus were at risk because of where our major infrastructure was located. Although we were not able to do all the mitigation that we knew needed to be done, because of funding sources, which was raise that infrastructure where it was as much out of risk as you could have...envisioned. So, what we

did...is we had probably about 20 small portable generators like you would go buy at Home Depot. The reason we survived and had so few fatalities within our facility compared to some of the other facilities in XXXX is that we had the ability to take and sustain our people who were on ventilators and other critical life-support systems that required electricity, because we had those generators. You know, we had extension cords running all over the place but, you know...they worked. And we had them [generators] mounted on exterior fire escapes, out on roofs, you know, so that they didn't pose a fire risk or an exhaust, you know, carbon monoxide risk to any of the staff. So I think that although the conditions were untenable from a heat perspective, we did have adequate food and we did have adequate water. That is the main way that we survived and, you know, because we knew...that we would lose our generators because of our location and, although we didn't have the 20-foot tidal wave...that (had been previously) predicted...the levees broke and you had the flood so the basements of both institutions were flooded, which took out the transfer switches and electrical service for both hospitals. I think under the circumstances, you know, given the design of the facilities, we were as well prepared as we could be."

Respondent 13, Facility 9:

"I think that in general, there are things that you can to do prepare, but I think if you've seen one storm, you've seen one storm or if you've seen one disaster, you've seen one disaster. There are unique differences with each one that, I guess it's what you're not prepared for or what you didn't anticipate that you have to respond to that creates so much anxiety and is just anxiety provoking. Then you think about the hospital is pretty contained, or the health system is pretty contained. But then the community that you're within and what they go through. How do you, as part of that community, respond to things that weren't anticipated? So you can anticipate a lot

of things, but like you mentioned, radios were in one of your interviews. Well, we had 800 MHz radios which were trunked with the county and the city and the emergency operations center... but, the towers for those were blown down so they didn't work...you can be prepared and have redundant systems, but then, if they fail, what do you do?"

Respondent 14, Facility 9:

"I thought that we had a pretty good plan. A good plan to evacuate the patients, and they had actually exercised or operated that plan and implemented that plan with Rita. Although the storm veered away from here, a lot was learned with that total evacuation of the hospital facility in 2005...Therefore, our plan was updated. As Ike approached, we put our emergency management plan into operation. XXXX has a very well coordinated emergency response, state-wide emergency response system in plan according to the office of the governor. And so whenever there's a storm approaching in the Gulf, we start conference calls typically a week or so in advance of the anticipated landfall and begin to coordinate distribution of resources and the like. This storm originally was anticipated to go into Mexico, and it kept shifting its way up the coast. So we had plenty of advanced warning that a big storm was coming. As it grew in size, I think we all became more frightened, but because the wind speeds were low, we really weren't thinking about the size of the surge that we experienced. That said, we put our emergency plan into operation and we shut down our labs when we determined that the storm was likely headed this way, which was on about Tuesday night or Wednesday before the storm struck on Friday. We sent our students away. We notified our ride-out out teams, as we do, to determine who would stay on site. We kept about 500 people, 250 caregivers because, again, we weren't anticipating such a significant surge and...we would need to get our hospital back in operation to support the first responders...who would be here...helping clear debris and bring

things back to life. About 250 support personnel, about 100 of those were police officers, about 100 were facilities specialists, and the remaining 50 were other forms of support. Then we sent Our...IT business continuity people off to a data center in XXXX and so we were prepared to operate at a distance. Basically, batten down all the hatches, did a total evacuation of the hospital, close to 600 patients. A number of them were ambulatory, so we ended up transporting about 330, plus or minus a few, by ambulance. Some were evacuated by air ambulance, fixed wing and helicopter, and by ground ambulance. We accomplished that within 24 hours without any significant incidents, our plan worked well. We learned a lot from Rita. So everything went according to plan at that point. We felt that we had our generator capacity positioned correctly ...a lot of resources, fresh water, all of those things. So we thought we were pretty well prepared, as well prepared as we could be according to the plan, before the storm arrived.”

- **Meaning Unit # 2: What are some of the critical experiences you had or significant lessons learned?**

Respondent 1, Facility 1:

“A logistical thing that changed post-Katrina...Since...we were almost like this beacon, even our parking lot lights were on and when everything else post-Katrina is dark, you just glow, absolutely glow. So the day after the storm...everybody...in the community must have figured out, ‘Hey, what’s that glow?’ And then figured out, ‘Wow, we don’t have any electricity at my house and we can’t eat hot food and we know the [hospital] cafeteria is a public cafeteria.’

...This is something we didn’t anticipate in the EOC...we left one of our early morning meetings and...the line is out the door. It’s snaking through the front of the hospital...for food. And part of our disaster plan...EOC plan...we have emergency supplies. And...it breaks it down by department. And each department head comes to the EOC meetings or somebody in the EOC meeting says, ‘Here’s where we stand on water, this is how many gallons, this is how much time

we have, this is how much diesel we have, this is how much food we have to feed everybody in-house, what's the census? Okay, with that type of census we can feed everybody for five and a half more days.' Well, the director of food and nutrition services ran up to the meeting says, 'Wait, wait, wait, I've got a problem. We can't feed the public.'"

"Here's one, probably the biggest one that I think we're aware of: dialysis. We can dialyze in the hospital. But this...the huge need for the region is a way to have dialysis available for the patients post-storm...not everybody is going to evacuate, no matter how much you can preach. So what ends up happening, these poor folks that need it, they can't get it. And a lot of your clinics and dialysis centers, they're closed. So then, they're showing up with us and we're taking them as quickly as you can...the clinical people are the ones that do it. Maybe they normally have to be on a dialysis machine three days a week, but okay, we're going to do you two days a week, you know, shorten it. And that's a huge need for the region, probably the entire state."

Respondent 2, Facility 1:

"We're going to grit our teeth and we're going to hunker down and see this thing through till the end. And I think some of that kind of intent, you know, discussion and commitment, is critical 'cause you can't have people flapping around on you. You know what also feeds into that is the people themselves. It was interesting to me in all of these hurricanes...Katrina and stuff ...to see who had the endurance...not just a matter of 24 hours, you know and...I watched that and you know to me, you have to pace yourself a little bit, you know. I've stayed here the whole time through all of them, but I take a nap once in a while. This sounds simple but, I take a nap and I don't sit there and worry every second while I'm napping. I need a nap, you know?"

And I've seen others who are pretty strong people, they think they're going to power all the way through the end, and you see them go and they're just burned out. And for another day or so, they're not worth anything to you. And you might need them...you know what I'm saying? So you have to take those kinds of personalities and the leadership style or endurance or whatever you want to call it of people that are key to you into account when you're making those decisions, at least from my viewpoint.

But I would add this: our experience has increased. It's one thing to have a plan, which a lot of hospitals have around the country and I've been in with the CEOs of a lot of those hospitals. It's another thing when you live it, you know? Living through a hurricane, when I first came...we had Hurricane Andrew and that was...that... came right on through this area, you know? That's just an experience that for people that is very...very...what should I say, deepening thing. And Katrina took it to another new high. I think for even the Cajun people of South Louisiana that was...that was quite an experience, you know? And it changed their paradigm a lot, a lot of them. Now you see some of them who do leave here, people who wouldn't have [left] in the past, like some of our doctors that grew up here. So the judgment. . .the key matters of how to communicate effectively, the trust level of the teams...the teams that work together in that; the ability to organize things when you don't know they're coming. We put a dialysis center—we don't have a dialysis center, we don't do inpatient dialysis, we have third parties that do that. They all left during Gustav. So we had nurses...that decided to stay in the area. You know, we found all these people and put these teams together. The ability...now resides more so in this organization than it ever did before Katrina. And that's what I have more confidence in, you know? The ability to go get whatever it needs to be...get whatever you need to and pull together and provide the service and keep on going.

I always...it's part of that lying awake in the morning...in the middle of the night trying to figure out what it is you haven't considered or even if you have considered it, something that could happen. There's so many experiences, so many unknowns in those situations. You really do worry about it. Do you have the right people in the right place? Can you depend on these people? If they're not there, who's going to be there? Things like that. But there are weaknesses, I'm sure we have weaknesses but it's more of, 'Are we going to perform the way we expect ourselves to perform?'"

Respondent 3, Facility 2:

"...When you read The Joint Commission manual, the accreditation body...if you read the accreditation manual now...about every other change they made in the manual came from some lesson that we've learned here or at one of the other hospitals in New Orleans ...this building had between three and four feet of water in it depending upon where you were. Our traditional hurricane plans evacuate patients from the second floor down to the first floor for reasons of avoiding the airborne debris and breakage of windows...And when the water hit here...and we had no idea that this facility would flood...the water hit here as the storm surge got worse and worse, we ended up moving all those patients back to the second floor...and many of them after the power was already gone. We had one 600-pound patient that went up in the elevator. That was the last elevator ride. Everybody else got carried up the stairs. So it was kind of a redefinition. We looked at the plan again and for a hurricane situation, our hope is that some protective measures can be put into place. We're still wrestling with FEMA over whether or not we can actually engage some of those protective measures or not. Everything that we've done to this main hospital facility up until this point is now what they call 'temporary permanent reconstruction.'"

“...our emergency capabilities are better now, but still only as good as the backbone in the community.”

“Well, I think first it would be that people understand how the command structure works. We found other agencies didn’t understand who was in charge either, which created a tradition that we ran here for several months. Cookies every day at two o’clock. We used to bake cookies once we had the little kitchen back, and we could get the other medical providers to come in... we wanted everybody there for kind of a two o’clock coordination. Because the first problem we had was when providers and suppliers hit the ground, they all tried to go their own way and they all ended up driving around the same neighborhoods, helping the same people. And so if you’re not from here, as they say, you don’t really know that there are people way out in this part of the county and you need to go look over here and of course all the signage and stuff is gone so you have to give them directions. But, I think the command structure, not just within the hospital, but within the whole community and how that plays for the EOC. Basically, in terms of hospital response, and it’s hard to overemphasize the drills and making the drills real. You know, making the drills count. And that costs a little money in terms of personnel and time. We’ve taken that as part of improving the structure, we’ve built an internal website for the response that people can use to check on each other’s supply levels and actions and what’s going on. And I guess the third one would be before you need it, you might want to read the FEMA handbook and then understand what the OIG does afterwards...you know, having some idea of what the FEMA requirements are. So that you can...arrange in advance...you can arrange recovery contracts. You can arrange for labor contracts and food and catering and that kind of thing. If they’re not

going to pay you to do it, then you need to have catering already in place. And you can...do those contracts in advance...for example, we have our computer system archive purchase orders for three years. We're now five years post-Katrina and FEMA is still asking us for documentation from purchase orders from four years ago, which means I don't have them because it's no longer archived in the computer system. They want to know...your subcontractors...we had subcontractors come in and rebuild the chillers and the electrical system to get the building ready for power again...it was day 16 before we got power back...FEMA is detail-oriented...the OIG wants to know who did the work, what the worker's name was, what their skill level was, were they a licensed electrician, were they an apprentice and how many hours did they spend on which aspects of the job and your contractor won't be able to give that to you five years later, unless they know up front that they're going to have to keep it...we had to hire a person to do that after Katrina, because we had over 30 project worksheets that had to be kept track of...the OIG will come in and audit you five to eight years after the fact. And so you need for your documentation to be somewhere. That's pretty scary because they could take money back...they came in and did one preliminary audit on one part of a project worksheet and took back half a million dollars. That was probably correct to take back, but you know, it needed to be in a different project worksheet, so it was a technicality, but it just shows you that if they had done that eight years after the fact, you wouldn't even remember. Let alone be able to document it."

Respondent 4, Facility 2:

"...another reality I think you need to recognize; everybody has to recognize. You can give us all the equipment you want, but when I've only got this many people, that's all I got. And so you have to figure out on the fly, most of time, what's the most important thing we need

to do cause there's no way on God's green earth that you're going to accomplish everything in this plan for securing the facility to...I mean, it's wonderful, it's a great old plan, but you need an army to do it and the reality is, nobody has that many people. And if you think you're going to call up the fire department or the police department...and we're blessed here...and you mentioned it earlier on when you mentioned that everybody's friendly and that's wonderful. We have...even with all my time in the Service...I've been through tougher stuff here...all except for Vietnam. But I've been through tougher stuff here with this crew and there is nobody I'd rather be with because...and we have our moments, we haggle and scrap at each other and you know do our own thing. But when the crap hits the fan, everybody's in lockstep and you know, there's nobody I'd rather be with to face a challenge because I've been there and done that on numerous occasions but Katrina was probably the biggest one and we got it done and...the community is the same way...I know the Police Chief, I know the Fire Chief, and I know the Mayor...and you know, I have their phone numbers, cell phone numbers...the Fire Chief in XXXX, we're friends, we go to meetings all the time, we participate in the community events...one of the things that I think is a big event...and it may sound kind of trivial, but...I belong to the Chamber. I participate...the hospital always has somebody to participate in all those things so we're involved...all the time and not just one once in a while, you know? We're involved all the time. So we're doing health fairs all around. We have nurses—school nurses in every school in the county. We have I think, 14 clinics now. And so we're out there and we're integrated in the community. And I think that when it comes time to, you know, I have... my assistant here...when there's an incident, she's our go-to person. She goes to the EOC, she's our liaison for the hospital so we have somebody there that knows what we're doing and can serve that function. And the emergency manager and his staff, we know them just as well as we

know our own staff. So, that's real important I think...You've got to have a seat at the table, you've got to. If you don't have one, you need to make one. And here, it's never been an issue. We've always been involved. And a big part of it, too, is frankly, the boss. The boss kind of sets the stage."

Respondent 5, Facility 3:

"...we do get to practice the plan and a part of every hurricane scare that we go through, or actual hurricane we go through, there's a debriefing and we say, 'Well, what worked, what was problematic, what could we change a little bit?' ...there were no dramatic changes post-Katrina, because the plan worked. It was true, tried, tested and it worked very well...the single greatest weakness that we encountered post-Katrina was communication ability...landlines didn't work, cell phones didn't work very well, if at all. And we had trouble communicating from here, outward. And people outward had difficulty communicating in. That was extremely problematic on both sides...We've always had 800 MHz radios...we've greatly increased those. We had some satellite phones...we increased the satellite phones that we had. We have satellite now...satellite Internet capability. Probably the biggest thing we did is we have a disaster website. The company is actually out of XXXX, I believe. It's called FastCommand. They contacted us and essentially what it is, is a disaster website. And if a disaster occurs, whether it be a hurricane, tornado, or chemical release...whatever, we can deflect to that website so that anyone who logs on...will get our disaster website. And we can provide up-to-date information. We have it set up so that even if we're unable to enter data to get it in there, we have satellite phones, we can get information to XXXX and they can get into our website. So that we can say...here's what's going on, here's the conditions, here's what we need, here's what you need to be doing [employees that have evacuated]. So that we can keep the

communication open and they can also [people from the outside] send, kind of in a blog format, information in, 'I'm okay.' You know, 'everyone is okay,' so that we can do as much as we can to keep the lines of communication open.”

“We have acute dialysis at this hospital. We do provide dialysis at this hospital...It was a problem [in the community]...here's the difficulty, dialysis centers outside this hospital are private enterprises. As a result, they don't get a whole lot of help or benefit immediately after a storm. They have to have water and power. And until they get water and power, they can't operate. But the feds are going to say they can't intervene on their behalf because that's a private enterprise. Something needs to be done about that. . .We had lots of dialysis patients show up here and we did the level best we could to treat them. As a result of it, some of those patients ended up having to drive a good little ways to go get dialysis.”

Respondent 7, Healthcare Association Executive:

“The biggest problems we had through Gustav...is in oxygen. And it's because of all the homebound people. And it's not so much in the hospital but it's the homebound sick that are on home oxygen. Most of those folks are on low-flow oxygen which is like a one liter, the little nasal prongs, one to five liters per minute...what happened is the O2 vendors bailed. There's a thousand little companies that can sell oxygen out of their storefronts and they just close shop and go. They showed no responsibility to their patients and those patients are left coming to the state, coming to us, or coming to the hospital, and there's no room in the inn for them, or at the shelters. So we developed, post-Gustav oxygen planning...met with the big oxygen manufacturers and worked with the Office of Public Health and their procurement areas and their supply areas. We then could buy thousands...of the small home cylinders of oxygen that we

would have for an exchange for patients that needed them because that segment of the vendor community failed, failed their constituency, they failed their customers...The dialysis centers were as much of a problem if not more so than the oxygen because the critical nature of that. You had to have dialysis and there's just, there's only so much dialysis resource out in the state."

[Regarding patient tracking] "...why the federal government doesn't go to FedEx or UPS and say, 'Build this for us?'...I can buy something from Amazon.com that's made in China and ship and get to me in three days' time and I can find out where it is any point in time and...and I can't do that with a patient. I think patient tracking is one. I also think the whole electronic medical record piece of this and that exchange of information is another piece that's getting a lot of attention, and it will because that's part of the affordable care act in healthcare reform. And the mandates for electronic medical records and in those cases and so I think...and we found out after Katrina and after Gustav that patients were getting pieces of their records sent to them and putting them in a Ziploc bag...and they're laying on their chest as they left and the things that they could to try to piece together their care. Same thing the oncology patient does, what chemo am I on? ...that is very complicated. So if they're not in the hospital and they're getting outpatient chemo, that's still an issue..."

"Fatality management is big now. The pandemic, you know the H1N1 piece made everyone start looking at their fatality management plans. Katrina made us look at our fatality management plans. How do you deal with mass fatality? We did, with H1N1 we bought probably close to a thousand ventilators. Little emergency ventilators that are used by the Russian and Chinese armies, battery powered that you can either run them on air or on a hundred

percent oxygen...and you've got these staging protocols...triage, you know that critical triage capability is who gets a ventilator and who doesn't. When do they pull off a ventilator so somebody else could have one? You know, battlefield triage...those questions and those decision trees...have to be addressed. So you've got a lot of that, which is a piece of the fatality management and mass fatality, mass casualty events. There is a lot of conversation on those types of things these days...It is a very hard conversation. Florida put out a plan about prioritization of ventilators...and they took an awful lot of heat, an awful lot of heat for it, because it came out extremely cold and callous even though nobody in that room was thinking in a callous and unfeeling manner."

Respondent 8, Facility 4:

"...one is trying to move 400 patients, some of them down as many as eight flights of stairs...equipment to move people, because if you had an electric lift, well, none of that was working. However, there are things now that are pretty neat...the things that they have to help in evacuations now. But we also had...we called it a 'hole in the wall.' To get to the heliport, number one, the elevator to that...all the elevators were under water. When it started flooding, you could just hear the shafts being filled with water. In order to get to the heliport, of course, the elevator was not working, so we had to put most of the patients...unless we wanted to carry them back up 11 flights of stairs, there was no way we could do it. There was a hole in the wall that was a plumbing room or something. It had pipes and all that stuff, on the second floor, so we moved all the patients that went by helicopter...we moved them through that hole onto the back of a pickup truck usually on the other side because from the hospital to that garage that hole connected. Then we would go up the eight floors and then have to carry them up two more flights to the thing [heliport]. So that's how we evacuated those babies. Now remember, some

of those babies were in isolettes that might have weighed 500 to 700 pounds. One of them in particular...was a transport isolette, which actually would not fit on the truck, and so then some of the guys had to push it up eight flights of stairs and then when they got up there it wouldn't work. There is equipment out there. There is specific evacuation equipment whether it's stretchers or lifts or all those things that are now available to hospitals to provide."

"Absolutely. I think there has been a tremendous effort on education, assessments of the facilities, individual resources put into disaster preparation and training...each of our regions in the state has a key person that keeps those communications going between hospitals and facilities. There has been a lot of drills, constant drills and...table-tops or whatever. So definitely, I think the focus, a lot of conferences, a lot of education. So, I think there has been [a tremendous effort on education]."

Respondent 10, Facilities 7 and 8:

"I think the first thing is that many hospitals, this hospital, the XXXX, and others had way too many people sheltering in the hospital...I mean, what we did at Gustav, we were down to the bare number of patients that we didn't feel it was right to move in a pre-storm environment, yet, we thought we could manage if we had to manage a post-storm evacuation and then the minimum staff to care for them. Whereas, here, before Katrina, there were family members housed in the hospital, many patients, probably a little bit too many folks, and then people staying over in laboratories across the way watching their research labs. We had family members in a hotel, all of which ended up in the hospital after the storm. They came wading over here after the levees broke, and I think a total of 1,600 people had to be evacuated. That meant they had to be fed...slept, all that sort of stuff, and...the sick patients, taking first priority. It

made the logistics of everything tougher than it should be. So for Gustav, we had it down to...no pets, no family members. If you had to come in, just caregivers, and in the case of relatives of patients, really, only the pediatric patients were allowed to keep a family member present.”

“There are a lot of people who are still here who were rescued by helicopter off roofs. They’ve got religion on this subject. And this state, and this city, in this region, takes hurricane preparedness very, very seriously. There may come a time when this becomes some distant memory for somebody or a generation passes and maybe people will get sloppy about it, but I don’t think we are going to see that for awhile. I think we are very serious about it here. [For Gustav]...we all had problems and people got out of town and then the storm didn’t flood the city and people all wanted to come back and they were concerned about looting, they were concerned about the power being out at their house and the refrigerator going bad and these sort of things. There was modest damage from that storm but huge concerns on everybody’s part, you know, they had this post-Katrina image of New Orleans and they were thinking about getting back here. I am more concerned about the population being a little bit less willing to evacuate should there ever be a call for it again and that coming back to bite somebody...the most vulnerable in the community are the ones you want to move and get up and make sure you do evacuate them. We’ve got a better system now. I think Gustav was hugely ahead of what Katrina was like in terms of all these sort of things and it was really kind of neat to watch. I believe this, I believe the levees are more robust now than they were, so the chances of something like that happening are lessened. Are they [the chances] absolutely gone? No.”

Respondent 12, Facility 9:

“...Texas Division of Emergency Management (TDEM), and they also have a wrist-band

system that is tied to a database that is tied to a GPS system so they can track patients wherever they go...it's called TxSNETS, so I kind of load TxSNETS in together with TDEM...then there would be local county jurisdictions, the University of Texas System...we're about 15 institutions spread throughout the state that could be resources to us. We're part of the Texas Medical Center and they've got a fairly robust emergency management program that's run by a fairly experienced person. We have the East Texas Gulf Coast Trauma Advisory Council and that's basically involved in regional planning or regional response. We have a Catastrophic Medical Operations Center (CMOC) that's up in sort of Northwest Houston. We just had a meeting with them and the state last week to say we want to better integrate our operations with yours. For example, if there's an evacuation and while we'd be watching the Gulf when it looked like it potentially could come our way, we will have been sending census data to the Regional Liaison Officer (RLO) at the state and CMOC...for a number of days so they can get a sense of how many ambulances, aircraft, and so forth that we would need. If we pull the trigger and say we're gonna evacuate...we notify the RLO, we'd notify the CMOC. We do have a point-to-point evacuation plan with XXXX Hospital in XXXX and that kind of mirrors the state evacuation plan because there's a point-to-point evacuation plan in their multi-hub plan but it deals with XXXX to XXXX. We would notify XXXX who would give them a patient census. We would quickly have an understanding of how many patients we need to send to other institutions and the CMOC would help us coordinate that movement. What you had here, even though there wasn't a lot of planning for evacuations, a tremendous amount of resources and help from other agencies, 400 ambulances, you know, from, I think as far away as Maine. There were helicopters, aircraft."

Respondent 13, Facility 9:

“I’m trying to think of what we may have done differently after like, Katrina. Because after Katrina was the first time that we have ever evacuated our hospital, and Rita was headed toward us as a category five storm and was huge, filled up the Gulf. That was the first time we ever decided to evacuate our facility. So I think we did that differently because we didn’t want to relive what New Orleans had been through. And it worked out really well. You know, there were something like...maybe 80 ambulances and 20 aircraft that evacuated a little over 400 patients in 12 hours from our facility and left only a handful of people here. Then, the next day, this is in preparation for Rita, the next day, most of the staff who were here were released had nowhere to go because a lot of them had been evacuated. So a cargo plane took them to XXXX...so then we had to deal with how do we house them in XXXX? How do we feed them? How do we get them to their loved ones or whatever? So things that we hadn’t thought about in our planning, you know, came up. So we did it on the fly that first time. We got everybody’s cell phone number on a piece of paper and you know, sort of do it like that but, just making sure that those systems are more refined in case things happen that way again.”

Respondent 14, Facility 9:

“Then we started getting reports about the size of the storm surge from the offshore buoys. So we started calculating how much damage we would likely have and it became apparent that with a 13 to 15, perhaps even [an] 18 to 20 foot storm surge, the damage was going to be significant. By that time, we couldn’t change provision for the number of people we kept here, and the reason I say that, had we known that that was going to be the case, we would not have planned to reopen the hospital. We would have sent those 250 caregivers away. Although with the wind speeds of this storm, the integrity of the buildings was never really an issue, but

still they were at-risk. And, so it would have been nice not to have them here. So I think one of the things that you're assessing is, you know, what did we learn, and I think we all learned about the Saffir-Simpson scale and its shortcomings and looking at wind speed as relative to surge predictions and the like. Then, doing a complete assessment of the damage from both and putting together a scenario of what's likely to happen and using that to determine who stays on-site in terms of direct immediate support for the facility. Who do you station away and bring back within the first 24 hours after the storm passes when roads are passable and things are connected and then, you know, who in addition to that do you need for support over the coming days? Along those lines interestingly, one of the things that we really hadn't thought too much about was physical fitness. We kept a lot of our senior people here, particularly on the facility side because they know the most about our different...buildings and the like. In those first days after the storm, we had power. We had plenty of generator capacity. We had fresh water. We did not have a functioning sewer system or flowing water coming from the city...Its infrastructure took a very, very heavy hit. So we were carrying dry ice up and down stairs. We didn't have elevators that worked because all the machinery was in the basement and some of our people who were less fit really struggled moving up and down. So really, on the fly, [we] had to do a physical assessment of everyone and kind of change our shift work approach and get people appropriately deployed by fitness levels, as well as by age and job responsibility. So we've gone back now to look at our manning plan, our people plan for the future, and we are going to take physical fitness into account based on what sorts of functions we think humans might have to provide after a big storm. That said, everybody performed incredibly well.

We had what I think is typically the case where our people threw themselves into the work. Our mantra became to protect and preserve our institution for the future. We knew we

had suffered heavy losses that we could do very little about...in the short term, but we wanted to protect and preserve what we had so that we could get the school functioning again and so that we could get a research operation going...certainly protect our research animals and specimens. We didn't lose any of either fortunately, because our people worked hard to preserve them and then as much of the health care as we thought we might get operational. We kept our ER operating during the entire storm. We saw about 100 people during the course of the storm, and immediately after. Then one of the disaster management assistant teams that's staffed by homeland security came onsite to help us and took over that function so that we could let our people go. What I was getting to was we really had to watch our people closely. They wanted to work straight through the 24, 36 hours and we made them take breaks. We made certain that our supervisors were watching their people closely. People were assigned to the area where they actually could get sleep. They had comfortable surroundings. We had some air-conditioners that actually functioned with the generator capacity that we had and temporary coolers. Therefore, we did our best to take care of our people and support them and as soon as possible, as soon as we could get relief workers in, we did that and sent people away to get refreshed and then come back later. I think we actually managed our people power fairly well, but a lot of it was learning on the fly."

- **Meaning Unit # 3: What are some of the changes you have made, innovations you have adopted since the storms of 2005?**

Respondent 1, Facility 1:

"Normally...the Chief of Staff...is in the EOC as well. Now...with the chief of staff...the medical staff decided they wanted...a Hurricane Coordinator...That hurricane coordinator is somebody separate and he's invited to all the EOC meetings and then he'll be

giving his input, ‘Yes, I think we should stop elective surgeries. This is what the medical staff is telling me we should do.’ So he’s advising us from a physician’s side.”

Respondent 4, Facility 2:

“...we’ve set up a little box for everyone that has the Incident Command Center [ICS] job action sheets. And all the information, the vest and everything is all in the box. When it’s time to activate, you say, ‘Okay, you’re going to be logistics. Here’s your box.’ So you can open it up, put your vest on, see what you’re supposed to do and do it. It’s the same thing with the incident commander and each of the three key functions...it’s all in one big locker. It’s in a metal locker on wheels. Prior to Hurricane Katrina, it wasn’t on wheels. And obviously the wheels are so that we can move that joker out of there if we need to. But it’s all set up so we can plug it in. The radios are all in there, so it sits there charging the radios and if we needed to move it we can.”

Respondent 7, Healthcare Association Executive:

“So EMSTAT was birthed after Gustav as a way for hospitals to preemptively and then proactively report stats. As an event nears, hospitals are told, ‘Update your EMSTAT,’ and so, at that point, they update their contacts. They are supposed to do it routinely but they forget. So, we go in before an event and we flag them...so we have contact information for every hospital. We have their helipads; we have the lats/longs of those helipads. We have the generators. If they have multiple generators we know every generator they have. We know the make, the model, and the power capabilities. We also know what those generators power in those facilities. We know how much fuel they have, how much fuel capability they have. How many fuel tanks they have, what their burn rates per hour are. So we could go in and actually calculate usage rates...if we can’t communicate with the hospital, we can anticipate that hospital is gonna run

out of fuel in seven hours based on this program. We can arrange for a fuel dump for them even without communicating with them, which is cool. We know their oxygen status... We do know at least their reservoir capabilities for oxygen so that we can at least somewhat anticipate, 'Okay, if they need oxygen we know that we have to get resources for this amount globally.' ... We were able last year to do some GIS mapping so that we can map resources to hospitals... so all the hospitals are mapped on a GIS platform. We were able to use that during the H1N1 pandemic for putting out influenza vaccine and antibiotics and all of those materials you know the pan-flu materials that were needed. We actually used EMSTAT in the GIS mapping, and EMSTAT to be able to identify those facilities and use the National Guard to go drop inventory shipments to them and everyone. We delivered material to over 200 hospitals in less than 48 hours."

Respondent 8, Facility 4:

"We are, in fact, XXXX and XXXX received a HRSA [Health Resources and Services Administration] grant on surveying the schools in the state to see where they were with emergency preparedness. A conference was held, I guess earlier this year, maybe in March, something like that. So I'm sitting currently on a task force of this group and we are developing just like for hospitals, for schools, and resources for plans for those types of things, and then here at XXX... we are working on a grant for disaster preparedness and really looking at involving that in the curriculum. Most schools have some type of disaster or emergency preparedness, usually in like their community health course in the undergraduate program, but some schools, very few, there are some centers across the country and nursing schools that have stand-alone courses. . . we are looking at all that. I guess I want to just say for disaster preparedness and emergency preparedness, it's an all-hazards type of preparedness so you know, just because hazard vulnerability... number one might be flooding, might be biochemical or something like

that, but I think everybody has [got to be] really prepared for all-hazards preparation. So it just filters through whatever type of disaster it may be. I think that's really how you need to look at it. I don't know if you'll ever be prepared to have something like Katrina again. If it happened again it would probably be the same, I would think, or maybe hopefully not, because people are going to evacuate now. So I think that's one thing I think we are much better prepared (for) than we were five years ago. I think people are much more educated, much more thoughtful in their deliberations of what they need to do. And hopefully it will not ever happen again because I think we have things in place that we will get out if something like Hurricane Katrina, I mean people would need to get out."

Respondent 9, Facilities 5 and 6:

"Well, I think it probably even predates Katrina...9/11, you know, raised everybody's awareness about the need for emergency preparedness. Then you had the series of hurricanes that hit, you know, across the center of the state of Florida, which really raised the awareness of The Joint Commission and Centers for Medicare and Medicare Services for the need to increase the need for emergency management planning within healthcare facilities.

Probably the main emphasis that had been placed on it, is previously that most all of the planning was done strictly for a local community. That you would try to get resources within that community to support you if you had some kind of an internal disaster that rendered you incapable of operations or at least impaired your operations and you had to have outside, you know, you could transfer patients out or get outside resources to support you. What that has begun to point out is that you really need to have planning outside your community to be able to provide support. They are starting that cycle, you know, they started saying, you know, you need to look beyond XXXX...you know, you need to be looking to XXXX, or you need to be

looking to maybe even beyond XXXX...XXXX has been mitigated. We still have infrastructure that's at risk. We have put in floodgates, sump pumps and what have you to reduce the potential of the flooding in the basement. With the exception of some electrical equipment and our central sterile supply we have no mission critical element in the basement any longer. What is in the basement that is mission critical, can easily be moved out...like dietary. The actual food preparation is elevated...it's no longer in the kitchen, it's just food distribution and cafeteria so you can do food distribution and cafeteria someplace else in the building. We did it...we did for Gustav."

"From a regional perspective we are much better off. From a state perspective, we're a whole lot better off. Of course, you know, we are in the process of getting ready to build a replacement hospital. And the replacement hospital will be hardened, it will be able to withstand a category five storm. It's, you know, the first floor will be above the Katrina flood level or above what they call a 100-year flood plain. Second floor will be above 500-year flood plain and no mission critical services will be on the first floor. For instance, the emergency room and everything is on the second floor and above...you know, the new hospital, which I think that's going to be state of the art for any hospital that's built in the future or does major renovations is, particularly, if they're in an area of risk is to go on and define themselves that they can set in place to a category five. That's not to say that they might not end up being damaged and have to evacuate, but they will at least be able to survive...until the appropriate evacuation can be made. I think you will continue to see on both the NFPA 1600, which is the kind of a national consensus standard that covers disaster management, and with the Joint Commission and CMS, both will continue to expand the role of emergency management or disaster preparedness in

healthcare facilities. Now 1600 applies to, you know, that's everybody. That's all...NFPA... National Fire Protection Association and...CMS...Centers for Medicare and Medicaid Services. And the reason they're important, CMS is—if you don't meet their standards then you're not going to get reimbursed for Medicare and Medicaid.”

Respondent 13, Facility 9:

“...some of the unique things that we had...when I've talked to other people they think, 'Oh that's a good idea.' Like our maintenance people had all of their schematics and plans for our steam lines and our generators on memory sticks so they could...pull them up anywhere. And I think they printed it out and laminated the basics, but if they needed further detail they had the memory sticks. So that's something unique that I want to talk to other people about our experience with that, they thought was a good idea, and something that could be useful to them. Because it's really like I said, you know, what you don't anticipate or what you don't know that you may need some material that you don't think about needing in the immediate aftermath that is useful, I think.”

- **Meaning Unit # 4: Tell me about your preparation in terms of redundancy of leadership.**

Respondent 1, Facility 1:

“So we have a backup on our Environment of Care Committee...and my hurricane binder. So what'll happen is this, if I'm going out of town...we do have a backup on our safety committee. But this binder right here literally lets them know if something happens to me, if something happens even to the next person...obviously the Regional EOC person is going to be calling, 'We don't have (your) reports. We need your EOC plan.' And it's [the binder is] tabbed; it goes all the way down. 'How do we communicate on our radios? What's our frequency numbers?'"

Respondent 2, Facility 1:

“So, there is a lot of experience and there is a lot of experience even in some of the younger people who’ve come through these hurricanes since 2005, you know, and gained a lot of great perspective and how you offer them in those conditions and they’ve really done a marvelous job. So—but we have people who are designated behind people, you know, if they’re not here, we could do that today.”

- **Meaning Unit # 5: What impact did Hurricane Katrina and subsequent storms have on your plans, policies and procedures?**

Respondent 1, Facility 1:

“There was something that was established post-9/11 that kind of changed for the entire nation and it’s called NIMS, N-I-M-S, and they came up with a National Incident Management System. And...there is emergency grant funds that are put out every year. And it’s monies that come through HHS and it’s distributed by...the state hospital association. If any hospital wants to receive those funds then they have to be compliant with NIMS. Now, part of NIMS and HICS [Hospital Incident Command System], they teach you how to establish an Emergency Operations Center. I think probably EOC came about, post 9/11, as a result of it...it’s a unified command. And we use the same unified command in our EOC. Then our EOC reports to the Parish EOC. So if we’re in need of something, say post-Gustav, here’s a real example: Gustav comes, everything’s okay over here, the water...I don’t know if you’re familiar with...what happened...but there was water contamination. So the water plants weren’t able to properly sanitize the water. So then there was a boiled water order put into place. So what ends up happening, obviously for our potable water, we have a pretty good demand for it. We weren’t able to allow patients to drink or even bathe in...people that had open wounds...to even bathe in that water. So, we had a need for water...potable water. We could...the way that this EOC system is set up

now is that there is a web EOC and it goes straight to the state EOC. So I guess we're three layers down. So you have the state EOC, parish EOC, hospital EOC. We meet, we say, 'We have X number of gallons of water left that's going to last us a day and a half.' We don't know how long this is going to...going to go on and we put in an order. So we pick up the phone, call our Parish EOC, they get the order, they put it in. And from that unified command, they're...this is where it works really well...all of the orders are going into this one system; they can see where the needs are. And they start distributing water, supplies, anything that's needed for that one spot."

Respondent 4, Facility 2:

"Well, about two years ago, XXXX started a move to get everybody to standardize their emergency operation plans. And as you might imagine, that was not a real welcome task at the time because everybody has a plan and every year we have to submit our plan to get our license renewed. And I certainly understand why they wanted to standardize it, but it took us about two years to get the plan in the format that they wanted it and we've done that. We've added some policies and procedures that they wanted added. So I think again, standardization is a good thing so that if you went somewhere else you would understand how the plan goes. As far as disseminating information, we have a safety committee that meets once a month and on the committee is everyone from the CEO to the chief nursing officer. . .the chief clinical officer now ...risk manager, the infection preventionist, most of the department heads, and everybody from the lab to pharmacy to nursing and ED, I mean, it's a crowd...and we also have the pathologist who is the official chair...because...our safety is a combined safety and prevention thing...because we have all the people at the table, we can get some business done, I mean if there's something that comes up, we can make a decision and go and you've got the boss there to say okay,

let's go. And so there's not a lot of wasted time and effort to go, 'Well, I'll have to talk to administration about this.' Hell, I've got administration sitting there..."

Respondent 5, Facility 3:

"Nope, no family, no children...nobody. I will tell you that is very controversial because people tell me, 'Well employees just won't come in if you won't allow their family members to come in.' Well, I would suggest to you that you come here sometime because they do. We do not allow family. There are always exceptions to the rule and there have been exceptions made for very key people whose mother was the sole surviving relative and she had no place to go. So we bring her in and just don't talk about it. But as a rule, no family members. Here's the reason why: we have 600 people here; now let's say we have 150 patients here. Now we're up to 750 people here. We allow all of those patients to have a guest; one, not two, not three...a guest. Now we're up to 900 people. Now let's go back to the 600, and multiply that times three... you're up to 2,700 people in the building and you get to the point that you can't control it. I have to feed them...I have to sleep them...I have to take care of them. And you become dangerously close to depleting your resources. We just don't allow it...No pets, either, while we're at it."

"After Katrina...it may have been Tuesday morning, I got a call from my hospitality services guy, who's in charge of security and a whole bunch of stuff, he said...'We've got a problem and I need you down here as quick as you can get down here.'...I'm on my way down there and he said, 'We're getting ready to get overrun here. There's people wanting to get in this hospital to see their family members who are patients here, their family members who are staff here, and we're going to lose control of the building.' And I said, 'Shut the building down,' and we shut the building down. And the only entrance that was even open at all was right down here

in the parking garage. And we posted security and denied access to the building. I walked out as soon as we did that to talk to anybody that had questions...I was never concerned with people pulling out weapons and shooting...We did have the National Guard here...We set up, in our elevator lobby there's a telephone there, and we set up a system where people could come in and use our phone system inside the hospital lobby...they could call up to their family members who were in here. Or they could call their child's work extension and that child could come down and walk outside and talk to them. And it worked fine, but we did that, actually, for several days."

Respondent 8, Facility 4:

"We really didn't have anything written in our emergency plan, we did have stuff about family. What we basically...because to be honest, we had just finished revising our plan, probably a week prior...had just reviewed it and revised it. The thing was that we could bring immediate people like your children or your mother or father, usually a couple of people. What we did was kind of like a hotel that we had a desk set up when all the people started coming in. We tagged everybody so we knew who they were, kept an inventory of who the people were, who they were with, and where they were located at so we knew that. However, it didn't happen that way and it was very difficult for families and we had one nurse that brought in maybe a dozen people, it was a huge amount of people, and at that point in time, there's no way you can turn them away. I think some hospitals, and the one that I worked in after Katrina, had a policy that only one person could come in with each employee that was coming in and that person had to be an able-bodied person to be able to help with moving, lifting, or whatever it could be. I think it varies according to the different hospitals. Again, we tried to have a minimum amount, but at that point, it was not possible, I guess."

Respondent 9, Facilities 5 and 6:

“We had probably about 1,000 people. We had about 200 patients on each campus, very little family. Our emergency plan, you know, the only way a family member stays in the house is if it’s some way that they can assist with the care of that patient. And no family members for staff. And we make that clear up front with our staff is that if you’re on the activation team, is that you need to make provisions to get your family to wherever you feel they’re safe so that you’re not having to worry about their well-being...you know, family, pets, get your house secure. Whatever you need to do, and we let them go far enough in advance so that they can go home and get all those arrangements taken care of and then...report back.”

Respondent 11, Corporate Healthcare Executive:

“...a plan is simply a plan, and until you’re actually in a situation, there are just contingencies you don’t plan for or think of, so you have to be willing to certainly deviate from that plan based upon needs...I think another top thing that we learned was that even with that being said, you can’t plan enough. You can’t really have enough resources. You can’t have enough coordination of resources, and that’s probably where I think the biggest change for us came in, not only from an individual facility perspective when I was at XXXX, but from a company-wide perspective. Because since Katrina, as a company, we have now a team of folks at corporate that purely is focused on emergency preparedness. We were provided with a large additional number of tools, tool kits, resources, after Katrina, to better plan for upcoming events ...not just hurricanes but any type of mass disaster, mass catastrophic event. From a division perspective, we never really had a division-wide plan as a division over all of our hospitals. We just relied that each hospital had their own plan that would work. What we also came to learn is that we needed to have better coordination between our facilities because we had to rely on our

sister facilities to kind of take our patients, take our staff, to help provide resources, etc. and that just all kind of evolved on its own in the aftermath. So now, we clearly have, if you look at my bottom shelf here, you see the big thick binder on the bottom and the one on top. This is the full version...and this is the travel version in the event we have a disaster...of all the resources, all the plans, you know, we have a coordinated effort now from a standpoint of if the storm is coming in from the southeast, here's the evacuation plan. If it's coming in directly from the south, here's the evaluation plan or here's the contingency plan. If it's coming in from the southwest, because it certainly impacts which direction our patients, our staff may be going.

I guess that was the other kind of awakening is in our emergency preparedness, prior to Katrina...truly, 95% of it, if not more, was based upon pre-storm strike. We never really thought about needing a post-storm emergency preparedness plan...and so a lot more effort took place thereafter as far as how do we shelter-in-place for longer? What happens if we don't get these resources to get us out? I'm sure you've read, you've heard, you know, because we are a for-profit company, we had a lot of resources that were able to be deployed to us and we were pretty much one of the first hospitals evacuated out of the New Orleans area, and then the folks that corporate hired then assisted in the evacuation of...others...because the federal resources just weren't there, or the state resources, obviously. So, you know, I would have to say again, planning certainly is a critical piece, front-end as well as back-end...a much more organized, coordinated across-the-division plan, within-a-division plan, which we didn't even have before...the plans are built upon the size, the strength, the movement, the direction of it [the hurricane]...it doesn't have to be a category five storm for it to be a devastating effect, but at the same time we know certainly category five is gonna be devastating, you know."

“We do radio checks weekly on our HRSA emergency preparedness channels; 700 megahertz channels, 800 MHz channels every single Monday to where we can make sure lights and radios are working. It goes beyond hurricanes...it’s truly emergency preparedness, disaster preparedness, any type of disaster, any type of hazard, correct? You know, the other thing that I’m doing now as well, which is certainly a change is, I also serve, in addition to my division position over emergency preparedness, I also serve as a volunteer designated regional coordinator [DRC] for Region One, working with [individual’s name], to where it taps me into the city-wide, state-wide communication network, which we were not tapped into before, to where we can clearly know and see what’s happening all around us. I have access now to every communications system for every region in the state. If I wasn’t a volunteer DRC, I would not, I would be limited to only my region. Beyond again hurricanes, we’ve done avian flu preparedness, we’ve done, you know, terrorist preparedness, and all those drills we do collectively now as a region versus individual hospitals doing their own drills, doing their own things, and that goes a long way.

So we’re doing much more detailed preparedness and much more inter-facility, inter-regional type preparedness, where we weren’t doing that before...and it’s much more coordinated. It’s just elevated it to an entirely different level and...there was some effort there before, but it certainly got beefed up big time after Katrina.

Number one, we try to limit that [people] as much as possible because we had too many people on-site for Katrina, including animals. The other thing that we’ve done as a contingency is we have contracts. We rent out space where we have a location for our employees that can drop off their animals at the hospital. We will take them...and route them to this designated location where they’ll be sheltered and cared for and we send a team of people to shelter and care

for them. The other thing we do is for our folks who are not going to be sitting in-house but we need them as the backup...crew. We again rent out space in central XXXX. We send them all up there. They all know they're on Plan B, not Plan A, and they can go up there with their family. We provide food, catering, housing, what have you, and transportation, even if we need to get them there, or they can provide their own, and then if we need them afterwards, we have the ability to access them to get them back."

Respondent 13, Facility 9:

"Yeah, we ask those staff who know that they are going to be asked to be available for disaster duty, to make sure that they have a plan at home for their homes and their families. We ask them to activate that as soon as we activate any plan that we have and that they know how to contact their family members and that their family members know how to contact them. I have taken that tack up until now that we can't become a shelter for anyone. We just can't take on that responsibility."

"...what we did was we dialyzed them as long as we could that day knowing that they would get out by 5 p.m. or whatever. Most of them are ambulatory and can take care of themselves. So we got them out like that. The prison population is a population that you can't just send anywhere. So you have to coordinate that with the department of corrections and decide where they want to send the patients and where they can supervise them from the security standpoint. So working with them was an important aspect."

- **Meaning Unit # 6: What are your thoughts about evacuation?**

Respondent 1, Facility 1:

"...probably the main difference in pre-Katrina, post-Katrina that it has to do with the

evacuation of the hospital. Our plans...our emergency operations plans...have been the same or basically the same since probably the 90s. So, way before Katrina they were that way. But what we relied on for the evacuation of the hospital was just our own resources...contracts with XXXX Ambulance or different ambulance companies and also memoranda of understanding with different hospitals north of I-10 that would help us with bed capacity if we wanted to move patients. Now fast forward to post-Katrina. Post-Katrina is something that the state has really done well with and put together with, there's an online system where we...it's called EMSTAT, E-M-S-T-A-T. And then there's something called AT-RISK, A-T-R-I-S-K. And that's where facilities in particular, we're talking about hospitals, report their current state, status, and also they report their bed capacity, and their need for evacuation, either partial or full. So that's one of the main components that's different, post-Katrina. And then what happens is if you are...if you can't evacuate yourself or you're stuck with some patients, there's a timeline. They call it an H-Hour timeline that...and it's H-Hour 60 is kind of the drop dead point where you have to say "Shelter-in-place" or "Evacuate me." And if you say, "Evacuate me" at H-Hour 60, then soon after that the government, it's called M-I-E-P, Medical Institution Evacuation Plan, they're coming to get you. And for us, they're going to...the plan is to come to the front of the hospital near the ER, pick up the patients. They transport them to XXXX Air Force Base...and there's C-130's now. So, though that plan is nice to have and be able to fall back on, what everyone needs to realize...and our hospital does, but everybody needs to realize, including all our physicians...that's a last resort. It's a military operation. They're going to move these patients in a military fashion. So it's a risky thing, it's a tough decision that our own internal emergency operations center takes very seriously and you have to sit there and ponder, 'Are we going to do this?' 'Can we do it ourselves?' Because moving critical patients on...with the military is

potentially very risky.”

“...here’s where the AT-RISK system comes in to play...every four hours after H-hour 72, I think it is...I think that’s the H-Hour...they [the state] notify us. But every four hours you begin reporting your census. And in that report you’re giving them medical history/criticality of each patient. And then you’re giving your available beds. So all the hospitals throughout the state are reporting this. And through the state EOC, someone’s looking at it and saying, ‘Wow, okay, [this hospital’s] down to 60 patients. And if we need to evacuate all 60...where can we put them, where’s the bed capacity?’ ‘...XXXX has 27 beds.’ And they’re looking at that every four hours and they continue to update it in the system. It’s a spreadsheet and they’re looking at, ‘Okay, are we in the green?’...it’s color coordinated for them...’Those guys in the yellow and the red, we can’t move all of them.’ So there’ll be discussions: What’s going to happen? How’s this going to be handled? How are we going to handle it?...AT-RISK is the way they manage that bed capacity system.”

Respondent 2, Facility 1:

“Approaching hurricanes, they change directions and they change force, and you’re sitting here thinking, ‘Am I sitting here like a fool making a decision that’s going to possibly endanger people’s lives,’ and, you know, ‘Am I trying to be a hero or I’m trying to do the wrong thing here really,’ and it really makes you stop and think, you know, after you’ve considered how well prepared you are, ‘Is this the right thing or the best thing to do?’ It really...you know all the decisions in healthcare that you make...that’s a very key one. But I try to get the best I can out of the people that I work with. What is their feel for it? Their understanding of it. I want to make sure we’re as prepared as we can be and we don’t have deficits going into it, where

we know we're weak. You know, we don't really have as you said, 'second line people' or facilities, stuff like that, that's not ready to endure a storm. And then, that's what I think you get paid to do is make a decision and hang with it. But one of the other things that I do...and I did it very clearly before I...made the decision, I said to them, 'Okay, now we've made the decision, now there's no turning back.'"

Respondent 3, Facility 2:

"...the major adjustment we made was the evacuation decision...in terms of that because we work very closely with the local EOC and...the emergency manager. We took all of our patients out of the ICU and sent them to XXXX...where they were, you know, safe. But the ambulances couldn't get back because the roads were so jammed. So with the contraflow and taking up both sides of the roads, the ambulances weren't able to get back timely enough to keep them...cause we were considering at that point we would've gone ahead and loaded up a few of the other patients...and sent them out, too. But we did...you know, I don't know why I can't remember the name of the storm now...but after that we did evacuate. And that, maybe, is a good thing for the patients. It's a horrible thing for the hospital. And there is no financial back-up for it all. Because you discharge everybody, you've got people sitting here drawing salaries because you're an emergency responder. You have no patients to bill and then it takes us three weeks to get the census to come back up to a level where it was sustainable again as a hospital. We lost millions of dollars by evacuating, and there's no backup for that. So, in other words, this is after post-Katrina and there was another storm that came up and you decided to evacuate...financially we couldn't sustain. We couldn't do that again. We would do it if we had to, but it's just you have to be prepared for that several million dollar shock."

Respondent 4, Facility 2:

“...we’ve never shut the place down, I mean, we’ve never done that. So the thought of not having someone here to take care of folks after the fact...we discussed it, and then, of course, you had no idea of knowing what the magnitude of what was coming. Everybody felt pretty comfortable, so we decided, ‘Let’s stay.’ Again, another reality is, you’ve got a couple of things that happen, if you decide to evacuate and the governor or somebody hasn’t declared an emergency, guess who’s paying for that? You are. The other thing is that I guess people say, ‘Well, did you get rid of all your patients?’ Sure, we discharge all the healthy patients and get them out of here, but guess who stays? Not your healthy ones, the ones that can’t go. And the reality is...that in terms of transporting and all of that, there’s not enough transport around. I mean you have to make that decision, not hours in advance, you’ve got to make that decision days...days in advance. So it’s a double-edged sword, you know, it’s kind of a no-win situation. And you try and weigh everything, look at what’s coming. In terms of a hurricane, an evacuation...if we had to evacuate, we have a plan...our ambulance company...they are our folks that would evacuate us if we had to do it...and they have the resources, but if everybody ...was trying to evacuate at the same time, nobody’s going to have that kind of [resource]. . . I mean, it’s just the reality. So, you know, I think one of the things that we learned from Katrina was you better be damn well able to stand by yourself for at least a week or four days. I think Joint Commission is asking people to be able to do it for 96 hours...the magic number that they used. You’ve got to be able to do that, I mean if you can’t do that then you’ve got a problem. And that’s not easy to do, but we’re...I don’t want to say we’re all lucky because a lot of it, we planned to do.”

Respondent 5, Facility 3:

“We do not evacuate. Period. End of discussion. We’re a shelter-in-place facility. It, number one, makes no sense to even consider evacuation...If you’re talking about a 100% evacuation possibility, any disaster preparedness professional will tell you that if you perform a 100% evacuation of a modern healthcare facility, you should anticipate deaths. People will die as a result of it...There is an infamous...e-mail that I sent out on Friday morning before Katrina hit...and it reads something like:

Well, it’s Friday, and there is a category one storm that has just crossed over Florida and it’s called Hurricane Katrina. All of the models indicate that Katrina will enter into the Gulf, go north, then northeasterly and make landfall sometime Saturday in Appalachicola. Having said that, we are headed into the weekend, so everyone pay attention.

Friday morning we had no inkling that a hurricane was going to be here. Monday morning, the ...greatest natural disaster in the history of the United States hit...There is not enough time in between when we became truly concerned...and when the hurricane hit to evacuate all these patients, one. And beyond that, there is the financial component of it. When are you going to make the call? Presuming it’s going to take about 72 hours to perform an orderly 100% evacuation, are you going to start evacuating the hospital every time you’re within the 72-hour cone of uncertainty? That can happen five or six times a year. And it’s not...it’s just not going to happen...The discussion we have is one, do we go to shelter conditions?...[because that’s a pain]...it’s just a pain...for us administratively and for the employees. And if we make a determination...yes, we’re going to go to shelter conditions, well, then, when do we do that? That is a collective decision. It’s not a single person’s decision; not the CEO, not me, not any one person makes that decision. We hammer that one out and it usually gets fairly argumentative because there are those of us that want to go to shelter conditions sooner...rather

than later. And then there are others that, well it would really be better if we did it right at a shift change. And so that tends to push it back a little bit. The key thing that you have to do is if you're going to go to shelter conditions, then you're going to bring that Hurricane Team in, you have to do it in such a fashion that, one, they can make some preparations...but two, if not more important, those people who are not going to be here, that are on duty, you kind of have to give them enough time to get out of town...or to do whatever it is they're going to do. Don't put them in harm's way as a result of it. So that's where we have our big debates—are we going to; are we not. It's very expensive.”

Respondent 6, Facility 3:

“The problem with evacuating is where do you go cause you don't know where the storm's going to be. I mean it would make no sense for [us] to evacuate to XXXX and XXXX get part of the storm and lose their power...they're in no better shape than we would be in. So, I mean with hurricanes, they're going north as far up as they can and causing downed power lines and all that kind of stuff at other places, too. So, where do you evacuate? You can't evacuate to the east or west because you don't know where the storm's going to go in at. What I've never really understood is why don't we airvac patients out, especially with XXXX and their large transport planes, things like that...”

Respondent 7, Healthcare Association Executive:

“...Gustav...was the first full coastal evacuation...in the history of the United States. It was very intense...Not only did we evacuate over 1,000 hospital patients out, either privately or through the National Disaster Management System (NDMS) program. (About half of them were through the NDMS and the other half were private evacuations.) You also had 7,000-8,000 nursing home patients. You had another 25,000-30,000 patients go into different medical special

needs shelters, general population shelters. So you had well over a million people that evacuated ...during that timeframe.”

“...hospitals are places of refuge. They’ve always been that. They’ve been kind of the refuge for the community. When everything else fails, communities depend on what? They depend on that base infrastructure of support and life support. You know, they depend on fire, they depend on police, and they depend on health. So hospitals have that fiduciary responsibility...And as a CEO then you have that responsibility for the community as well as the patients and the staff that you have in-house, because you are the refuge...you have that decision of who can be evacuated, who can’t be evacuated...that liability factor is huge these days in decision-making on evacuation...As far as evacuation is concerned that’s an argument that’s nationwide and you hear it a lot...ideally, you would rather shelter-in-place. If you knew that the infrastructure was going to be intact. If you knew that your physical plant was going to stay intact...and that you could get to things that you needed, including supplies, which was an issue after Katrina. It was an issue after Gustav because of bureaucracy and policy to where they weren’t letting trucks through. So, we ended up getting passes for trucks to get past state police barricades that had critical hospital supplies in those trucks. So, there’s a lot of other considerations along with that. Can you get the supplies that you need post? I’ve gone around the country and spoken at length, and I went to New Jersey this year. I’ve been to New Mexico. I’ve been to other places talking about sheltering and sheltering-in-place and what are the lessons learned and the pros and cons of those things. And when you go with using the federal system, there’s this fight with the feds about what resource. We don’t have the state resources to evacuate people...We don’t have that luxury here. You know, we don’t have enough ambulances

and enough infrastructure to be able to do that. We also don't have enough, generally speaking, we don't have enough in-state bed capacity to evacuate just in-state. Most of our evacuations end up being out-of-state. So, then you've got to rely on a federal asset to do that. And the feds are saying right now...that they can't move any more than 150 patients a day...let's do the math...we evacuated 1,000 patients for Gustav. The math doesn't quite add up...And so you've got this huge disconnect in that. And so more and more we work with the facilities to build their shelter-in-place...so they can stay but that they don't have the same problems they had just post-Katrina and sheltering-in-place when they lost infrastructure, where the generators are...more and more the facilities'...desire is, 'We're just gonna hunker down,' you know, and we're just gonna, 'We're going to beef up and we're going to bone up,' but that's expensive to do. You've gotta bring in supplies and resources and everything else to try to get everything that you need.

Hospitals weren't evacuating their healthy patients, they were evacuating their sickest patients and those least able to travel. So, it puts those patients, they become even more fragile and they're at greater risk, and we lost some patients as a result of that...we lost a patient on the tarmac waiting on a C-130 aircraft. Because feds didn't put airplanes on the ground when they said they were going to have them there. We had the patients waiting on them. They said have the patients there at 4:30 in the morning and we had them there at 4:30 in the morning. They [the feds] weren't there. They weren't there until 10:00 o'clock that morning. And so we had fragile, compromised patients and it was hot...so we lost one or two. We lost a couple. The other side is that very fragile, very compromised, probably end-of-life patients anyway, but still. Then you've got neighboring states that reach out and are wonderful to us. XXXX, they were wonderful partners to us. They got just the shaft after Gustav. I can't speak after Katrina as much, but after Gustav, they were out millions and millions and millions of dollars that the feds

wouldn't reimburse...because they didn't have that waiver capability because they weren't in the disaster area. They weren't in a declared disaster. The governor declares a state of disaster ...requests the presidential declaration of disaster to get the 1135 waiver piece. . .So XXXX this year pulled out of NDMS...the NDMS system is kind of a network around the country, of states, it's not a compact to become an NDMS provider. And they say, okay we'll help out ...those hospitals in and around XXXX lost so much money after Gustav doing the right thing taking care of our patients for us that they told NDMS, 'Unless this is fixed we are not going to renew our contract with NDMS,' and they didn't. They served a notice of termination. . .So, you know, now. . .that affects those numbers of patients that you can transport and evacuate...We deal with the logistics of, I have X number of people I've got to move and I've, what resource do I need to put to bear?...Some hospitals CEOs do not want the liability. We had hospitals during Gustav that were the only provider in their community closed up. So there was no place of healthcare refuge for that community during Gustav because they didn't want the liability. They felt the risk was too great. They closed up. Closed the door. That's the risk."

Respondent 8, Facility 4:

"I think from the air evacuation, the hospitals that were completely surrounded by water, of course, there were only two ways to evacuate patients, and one was by boat or water and the other one was, of course, air evacuation. The problem with air evacuation in some hospitals ...I'm gonna say XXXX. . .I'm not sure of any others. I think there was one more that actually built a heliport because these helicopters were landing on some roofs that were soggy. The hospital that I was in, we had a heliport that really had not been used for about 20 years. We had just put in a couple thousand dollars [on it]...I don't remember exactly how much we put in...to support it because, it was like, falling down. We hadn't really used it that much because

XXXX was the trauma center and there was really no need to do so, we hadn't used it in many, many years, and the fact was that it really didn't have lights on it. When the first helicopter came, we had no idea if the structure would support it or not, which it did. Therefore, I think as far as air evacuation there are so many things that went on with this storm. Sitting in a building with no communication...we would put people up there [on the heliport] waving down helicopters to try to get them and once they started, they did. Finally, the company that we [contracted] for, XXXX, on that Thursday and Friday, did get helicopters in here, but the government took over that air space very quickly. The other thing that upset us at first, but it's just the way it is, when the city started flooding, we really did not see that water until Tuesday, you know, it took a while to get to us. On that Monday, we had started, also that Sunday, but more that Monday, we really started contacting some of our hospitals. We worked in a corporation and we had hospitals in Alabama, Texas, calling to see if we could evacuate some of our patients. Some of them accepted...many of them did, but the problem was, once the federal government took over the air space and started coming once in a while to pick up patients, they would only bring them to Louisiana [hospitals] so they would not bring them outside the state, so that was one of the issues there, too. The lack of communication, I guess, one of the first helicopters that landed, we didn't know...we went up to the heliport. We had no idea if they were coming or not or when, and they really just came to get patients. If we had none up there, they left. We decided from that point on that we had to have the patients up [on the heliport] and ready to go because we had no clue when they would come or not...

I think we need to evacuate, I mean, and I know there is some criteria in the city that has established what category of storm and I think they have it all planned. I'm not sure if that's from the hospital association or whatever with category one and two, so each hospital has been

looked at differently. So even XXXX might evacuate with a category two because of where it is and no protection where maybe XXXX and XXXX might not evacuate until a category four. It really depends on the assessments that have been done. That plan is in place so different hospitals will evacuate at different categories of storm. I think we never know what's going to happen and I guess we had never evacuated the hospital before and I think that's a problem in the whole city. We have never done a full evacuation of our patients and, in fact, when we, you know, there was some talk that these hospitals did not have an emergency plan. We had a very good one, we practiced it, we had drills throughout the years. I think the issue is that the whole infrastructure of the city, there was no way anybody could move throughout the city, so we were just isolated and there was no way to evacuate those patients in eight to ten feet of water until somebody came. I think people need to...I know it's an expensive proposition, but unless people have been through this situation where they cannot get out and when. . .the hospital becomes a victim itself, then people don't really have any clue. Because we can walk out of the front door of a place, you know, it's quite different than not being able to. All the NICU babies and all the plans have the high risk patients, the special needs patients, the ones on ventilators, dialysis patients, all those are in the plans and those were done (evacuated). The babies got out Tuesday, pretty much before our generators went out, so those were all gone, and our vented patients."

Respondent 9, Facilities 5 and 6:

"[We] have both fixed and rotor wing capability...ambulance capability and...bus capability. So dependent upon what the nature is or where...the patient has to go, how critical they are. The majority of our patients went out were by ambulance during Gustav. And all of them came back by ambulance. But they do have that and of course you have a high population

of what they call 'classified patients' sent to red, yellow and green. Red being the very acute, life support, ventilator, what have you. Yellow meaning that they probably got some kind of mitigated medical conditions that require constant supervision or medication. Green meaning they are probably mostly ambulatory and/or in some kind of recovery and are capable of being put on a bus...Whereas the red may or may not be eligible for fixed wing or rotor wing, although fixed wing is preferable evacuation. They usually, probably the only people that went out by rotor wing was our high-risk babies. During Katrina they [patients] went out, most all the high-risk patients went out by rotor...and then we had the green patients who were taken to XXXX and went out by fixed wing, a military aircraft.

Our position is we will set in place up to a category three. We feel comfortable that we can withstand the category three given the mitigation we've done since Katrina. Above, a slow moving category three or a category four, we will then evaluate what we think the most likely scenario is. We will then make a determination, even for a category three, we will evacuate dialysis patients. We don't want to run the risk of having dialysis patients in the building and not being able to have water to provide dialysis. So even for a category three, we will evacuate them. We have a mental health facility that is in a building that is not capable of withstanding much more than a mid to high-level category two. So category three, they're going. And we have arrangements with XXXX and XXXX to take those patients. And we go up there every year and kind of go through a little, you know...exercise...just let them find out where the patients will be and what the protocols are going to be. What we should supply, what they are going to supply, and what have you. For a category four we will evaluate, you know, we will always, even to a category five, we will be here and we will have at least an OR [Operating Room] open and we will have our trauma center open. Once you start getting into those extreme

levels, we will then make a medical evaluation of which we think is a greater risk to the patient. Setting in place and possibly not being able to be adequately provided for, or being transferred out and being put at the risk of the travel. I don't know that anybody can just absolutely say under no circumstances am I going to evacuate...or under all circumstances I am going to evacuate because you have to evaluate each scenario, which is going to pose different risks. Your plan has to be flexible enough that you evaluate the scenario that's at hand and then take whatever is the most cautious action that you can take to protect the lives of your patients and your staff. I don't know that anybody would evacuate before the governor declares a state of emergency...the governor has to make a declaration and he has to get the president to make a declaration in order to be eligible for federal assistance...I would say the people that put finances as a primary argument have kind of lost vision of what their mission is...And you know it is expensive because the minute you pull the trigger...If we don't move one patient, but just to pull the trigger...we've already put a couple million dollars on the line. Our protocol is strictly based on an evaluation of the situation to protect them. What level of storm it is, what the protector factor is...how fast it's moving and what action will put our patients at the least risk...I know there's not an absolute answer."

Respondent 10, Facilities 7 and 8:

"...you create a certain amount of risk in a prophylactic evacuation that may not be necessary. There is a story of some kid here who was on a bed with a big external thing and with the elevators down they had to carry him downstairs and all sorts of stuff to try to get him on a helicopter and fly him out and everything. So, the kid versus somebody who you can bag up a ramp someplace...So you have a tradeoff between the risks/benefits of moving just a simple vent patient prophylactically versus that kid I just described. So we ended up moving a lot of NICU

babies who were hard to move. When Gustav came...it's not easy to get enough transportation and get everybody out, you know...you have to manage your timing and your logistics just right. And Gustav also presented a problem because we became an evacuation site for all hospitals up in Baton Rouge. It was like a sloshing event for us. So you have to kind of manage for those things. Shrink your footprint, I like to say. Keep what you should and I'll defer to the good judgment from the folks on the ground about who that should be. . .almost a Noah's Ark sort of approach to things.

It is very dangerous to move somebody in an emergency situation, and I use the case of a preemie baby in a NICU, or a patient on a bag. We moved those patients under the calm, very early before the storm hits and we have designated hospitals we transfer to...So we transferred those...it's the ones that are in-between that I don't transfer that are...yeah, you could move them, and while the risk is much less to move them electively, running more risks than I think warranted for the small chance I might run a risk of evacuating them after the storm. I can keep their ventilators going, I've got dedicated transport. I can get them out easily but I think I'd rather just keep them here...most of the time I'm gonna have a Gustav where I didn't even lose city power and I would have moved them for nothing. So it's sort of a tradeoff and everybody's going to draw their own conclusions on those sort of things. My gut is move the really difficult ones and the very, very easy ones. Everybody in between are the ones you sit still with. That's my line.

Transportation is another piece. This hospital was evacuated by helicopters. Knocking down telephone poles on the top of the XXXX garage so the helicopters could land. XXXX contracted for several helicopters. Well, you know, it was like finding satellite time...you won't have spare ones lying around at this point in time. So they got a few modest things in here and

they started hauling people out, the sickest of the sick, but they were gonna take a long time, one or two at a time, getting 1,600 people out of here. Eventually, military craft showed up...the big Chinooks and stuff that could carry 50-60 people at a time between rotor jobs. That's when the stuff really started moving. Now, everybody pretty much, at least we do, [have] contracts with carriers to get fixed and rotary wing to get people moving both for pre-storm evacuations, post-storm evacuations, whatever immediately needs to happen. So we've got the logistics linked up.

The evacuation [the hardest decision for a CEO to make?]. . .absolutely! Do you know what one of those decisions costs? I can give you the long version of it, but the short version is, [a hurricane] drives my expenses up and makes my revenue go away. The cost for a hospital like this has about over a million dollars a day running through it, in a normal day."

Respondent 11, Corporate Healthcare Executive:

"We had a heavy emphasis on getting our critical patients out. Well, that's totally reversed now because we spent a lot more money and we have a lot better processes and systems and equipment and so forth. It is pretty much now back to a shelter-in-place philosophy unless it's truly a category five that we know is highly predictable and directly heading our way but, even with that we know realistically, there's no logistical way we can evacuate every patient out of XXXX. We just don't have enough manpower, enough resources. There's not enough ambulances, there's not enough helicopters, so we can still evacuate some but we have to certainly plan to still shelter-in-place with some of them as well.

...you don't know when to pull the trigger, you know, I mean, as you know, living here ...it's a matter of the latest report and how much time do you have and that's our problem...as I said earlier, logistically, there is no way that everybody could be evacuated. It's not physically possible, it's not humanly possible. We can shelter-in-place longer than we could now before

Katrina, but I certainly would not want any of my staff, or any of my patients to be around for a category five cause none of our facilities are built to withstand a high category four, or a category five, we know that. However, at the same time, we also know, as I just said, you can't get everybody out. So, Lord help us if that truly ever does happen cause...I think to an extent you have to be prepared to shelter-in-place, but at times you have to be more prepared to evacuate."

Respondent 12, Facility 9:

"XXXX has a state evacuation plan, part of that plan, there is a local...point-to-point plan. They load up buses with medical special needs patients. XXXX assists them with what they call, 'HEAT Teams,' Hurricane Evacuation Assistance Teams, which are basically students in positions. They help in loading the special needs evacuees. Now these aren't hospital patients...they are just residents...help them with loading the bus. They accompany the bus up to Austin and then they'll stay in Austin to help in the treatment of those patients.

I don't know if the number is accurate...it is something like two million dollars a day [in lost revenue from evacuating]. What I tell everybody is to think back to Ike. Imagine doing that evacuation when outside is flooded, there's no electricity, no water, or no wastewater...no elevators...and so you have to take those patients down nine floors of stairs and so forth and just think back and think about how that would have been. Of course, that was going to be a judgment call and, you know, potentially you risk, each of them involve risk to the patients, so you're trying to minimize the risk, the total risk...First you do census reduction, you know, those patients that you can. For the patients that you can, we have to evacuate them. For example, the Neonatal Intensive Care and Intensive Care are pretty much the two big ones. Those are the ones that you really need to take care of and the person making that decision has to weigh the risk to

moving them or keeping them here. Another thing to consider is that Ike was only a category two, right? Yet look at the damage that it did, right? Obvious lessons learned are that you're looking at the hurricane severity index and the size of the surge. Everybody knows that now, so it's nothing particular that we're looking at, you know, because the information that we're getting now from the National Weather Service...and we contract with a private company to give us a fairly specific tailored weather forecast for us. So, your decision to shelter-in-place, though, is driven by whether or not you have designed your facility for the risk, or if you were able to mitigate the things that weren't designed for the risk yet.

We started running some small drills for evacuation. This is Neonatal Intensive Care, this is an ECMO [extracorporeal membrane oxygenation] baby, okay? All of this equipment goes with this baby down, you know, hopefully an elevator, and it takes about a team of 12 to move that patient. Then they'll be taken to fixed-wing aircraft at XXXX Field where I believe it's a military aircraft with a specially staffed team of experts that will then transport that patient, I believe, to San Antonio. So, you can see that this is not a simple problem...it's just another example of how you have to address this in advance with very careful planning and testing and refinement to the plans and so forth. I have just checked today...they actually had to evacuate this (NICU) room recently due to a power outage. The first thing I asked them for is an after-action review of that evacuation and I put in there that I would like you to compare how the evacuation went to the procedures in your standard operating procedure for evacuating Neonatal Intensive Care, with the knowledge that more than likely there is no written SOP [standard operating procedure] on evacuating this room. The next step is for them to either pony up an SOP so that I can look at it, or they say, 'We don't have one,' and so then I can take it to the Quality Council and say, 'This is your first order of business. There needs to be a written SOP

[standard operating procedure] on evacuating this room, especially because the nurse manager is retiring in January.’ I’ve already told one of the VPs [vice presidents] to the hospital to make sure she knew that manager was leaving. We need to capture that knowledge before she goes.”

Respondent 13, Facility 9:

“Well, when you live in an area like this, every June to end of November, The Weather Channel is on in the morning when you’re getting ready for work, and you always have a wary eye toward the Gulf, so to speak. However, I think we were much more educated about what we wanted to do when Ike came along than we were when Rita came along, and we had talked a lot about our Rita experience over the couple of years that were between Rita and Ike. My personal role, I guess I can tell you about that. In Ike, we knew it was headed our way. We were in constant communication with the state emergency operations center. I went home on Wednesday evening, I left here around 5 p.m. to wash my clothes, get my house ready and put the plants inside and all that. I came back at one in the morning after I got all that done and the CEO was here and the chief medical officer and you could even tell more that the storm was gonna come this way by then. So we decided that, well, we’re probably going to have to evacuate the, you know 450 or so patients that we have here. How are we going to do that? So we spent from 1 a.m. until about 6 a.m. trying to plan out how we would do that evacuation and we had, you know, a couple of principles that we laid out first. One was, we would lose no patient, that patients would go to the right destination by the right mode of travel, and that we would know where they were. We articulated those principles and then sort of spread out. We gathered information about all of the patients that were in the house and asked the physicians who were on duty, the residents, to start summarizing the care of all their patients so that we would have those things ready in packets for each of the patients when they got ready to evacuate. We made the

evacuation call about 7 a.m. when we talked with the state emergency operations center. We told them, 'Yeah, we think we want to do this.' They had anticipated that and had ambulance resources ready and aircraft ready to evacuate our patients to XXXX or XXXX or wherever they were going to go...Some of the prisoners from the prison hospital went to XXXX, I think. We anticipated that we would, at least we planned, to get the most critical patients out first but that wasn't how the transportation resources arrived. The transportation resources [that] arrived were the least prepared to take the most critical patients out...so we had to sort of, on the fly, decide that we would have to go with that. So...it took us that whole day from about 9 a.m. to midnight, I think the last patient left the helipad at the ER at midnight that night. So that's sort of how we approached things...released all the staff after the patients were evacuated. I shouldn't say all, there was still a core group of people here. Probably about five hundred people...because [we] got the evacuation order late so there were still probably 20 to 30% of the...population that was still [here]. So we felt like we had some duty to maintain some healthcare for them...We kept our emergency department open and thought that if we are going to have our emergency department open we need people to be able to do surgery and that kind of stuff. So those people were here.

Well, I think that we were really smart that we evacuated our patients, both for Rita which wasn't much for us. You know, most of that went through XXXX...and XXXX got hit really hard...It was in the aftermath of Katrina so we had the knowledge that we had gained from that experience, or what we had seen on the news...from New Orleans to say, 'Hey, here's this huge storm headed at us, let's not put our patients or our staff in harm's way. Let's get them out of here.' I think we made that same correct decision in Ike. It would have been horrible to try to evacuate those 400 patients the next day. Of course, I think they would have been safe.

The building didn't suffer any structural damage from the winds or anything, but the toilets couldn't be flushed and it would have been a mess. No air-conditioning..."

Respondent 14, Facility 9:

"Well, we have a low threshold for evacuation now. The old-timers around here will tell you that XXXX never evacuated for less than a four and this thing was coming at a two. But...this is where we learned a lot from the Katrina and the Rita experiences. You just don't put it at risk because, even though our own capabilities in terms of what we generate with power and the like, we're fine. I mean no running water...we couldn't flush the toilets because of the XXXX infrastructure issue and the like. So there's no way that you could safely care for patients under conditions like that. And, so again, we think we have a management plan based on severity of storm that is appropriate based on what we think is likely to happen, but, again, we have a low threshold for evacuation. We know we can do it safely. We know we can do it without major incidents. We have transfer agreements with major facilities across XXXX. Even though it's expensive...it's the right thing to do...loss of revenue...You know, it's probably, add it all up again, one million and a half to two million dollars for the state...to do a complete evacuation by the time we mobilize all the ambulances and aircraft and the like. It's an expensive proposition, but again, you think about what would happen with critically ill patients under those conditions. It's just not worth the risk. And hopefully in the future, we'll have a much more solid infrastructure and, you know, feel more comfortable leaving patients in the hospital, except under the most severe conditions. But right now, we'll look at evacuation as an option for all but the most insignificant storms."

- **Meaning Unit # 7: Do you have any contracts with suppliers or mutual assistance agreements in force now for a future emergency?**

Respondent 3, Facility 2:

“...we’ve done a couple of things...one was just arrange through the vendors to make sure that they have a more dependable backup plan. In case their New Orleans region warehouse is down or something...that they can get stuff from Memphis or somewhere. But we also have worked with another company to provide a kind of secondary layer of backup if we need it.”

Respondent 5, Facility 3:

“We never hurt at all for supplies. We have agreements with...Owens and Minor for Med Surg distribution...and they were impacted in New Orleans. It wasn’t so much as their facility flooded, everything flooded and they couldn’t get to their facility. I believe our supplies then came out of XXXX, if I’m not mistaken. But they have other...sites that they can pull from. Is it optimal? No. Do you get by? Yeah. And the fact of the matter is, there’s enough people got enough supplies squirreled away that they’ve hoarded over the years, that you could live for a few days. Just from things that have been ‘just in case’ inventory systems. Linens, we do not do in-house laundry. If not in 20 some-odd years, that laundry facility was flooded and it was also in New Orleans during Katrina. We scrambled and came up with some alternatives. That’s been formalized more to where there’s several different laundries...Mutual aid agreements as it relates to patients...we have those. Those are very problematic. We’ve signed them with other hospitals. The problem with those kinds of agreements is you always have to stipulate to the degree possible. ‘Yes, I’ll take your patients, to the degree possible.’ And since most of our associations are coastal associations, it might not do you any good if you had an association with a hospital in New Orleans. It might not do you any good if you had an association with a hospital in Pensacola. It just depends on where the storm goes.”

Respondent 4, Facility 2:

“You know, you can have all the paper you want. The reality is when you get into this situation, everybody’s vying for the same stuff. You’ve got most of the healthcare facilities dealing with the same vendors, so we all use Sysco and we all use the major suppliers for medical supplies and pharmaceuticals. The choice is not unlimited. So the reality is, in fact, they’re having drug shortages now for some common drugs...So from my point of view, you know you got it in your hand, you know you got it. If you’re waiting on it to show up, I don’t know...we probably have more stock during hurricane season and that kind of thing than we did in the past. But again, it’s a cost...you just can’t go crazy...getting to the mutual aid agreements...The Joint Commission would like you to have a mutual aid agreement with every hospital that’s close to you. And have an agreement to say, ‘Well, I need beds,’ then you’ll loan me beds blah, blah, blah. . .our current mutual aid agreement we have right now is expired. . .it was a very simple agreement that said we’ll do what we can to help each other out, basically. And I think that’s all you’re going to get. But. . .if somebody revised it and they tried to put a lot of detail in there saying I’m going to tell you my inventory and all that, that ain’t going to happen. Nobody’s going to do that. Nobody’s going to commit to saying, ‘Oh yeah, if you get a problem, then you can count on me...to provide you with ten ventilators or whatever.’ That’s not going to happen. Now, if I call up and I say ‘Hey, I really need this,’ and they [have it on hand] they’ll let us have it.”

Respondent 8, Facility 4:

“Hospitals are looking at...mutual aid agreements and working with vendors to have a pallet of supplies and pharmaceuticals maybe stashed or held in XXXX or XXXX or wherever the place is, but having those agreements with those suppliers and pharmaceuticals and water and

those type of those things.”

Respondent 10, Facilities 7 and 8:

“...the idea is to basically have access to all sorts of supplies to be delivered. The helicopters that XXXX sent in here, every helicopter that came in that was gonna take somebody out, dropped off water, rations, and all sorts of things cause they were running out of stuff. People joke they were eating Pop Tarts and tuna fish here, but they had something to eat that was coming in on helicopters. You gotta get that stuff in here; that’s the problem having 1,600 mouths to feed and they didn’t have enough stuff for 1,600 mouths...for that period of time, particularly once refrigerated things started failing and stuff like that. So logistics, you know, busses, things like that...you’re gonna have to take control of it. It’s easier than not having them [contracts] to start with.”

**• Meaning Unit # 8: What were your experiences with communications?
What investments have you made in improving your communication capabilities?**

Respondent 1, Facility 1:

“We begin meeting and are reporting every four hours. And that’s, you know, every four hours we’re looking at our census, we’re looking at our staffing pattern...We call our own shelter-in-place time when storm riders have to be here. We’ll notify everybody through normal communication systems. That’s going to be through the department meetings, that’s going to be through phone calls, but we’ve got...something they call RallyPoint. And it’s an online system ...it’s a crisis communication system. And it’s a way that in our command center we can put a message out and we push the information. We’ll put out a message saying that, ‘Storm riders have to report for work at 5 p.m. on Sunday,’ and we push that out and it’s going to go out in a voicemail, it’s going to go out in a text, going to go out in an e-mail and it’s going to alert all of our employees. All of our employees are in the system. It’s going to push it to them, their text

messages are going to go off, e-mails are going to go off and they can go and get that information...the beautiful part about it is a department manager can then go back and look in the system and see, 'Wow, 48 of my 50 direct reports have received the message,' and they can start working on calling those other two and make sure they have the message...our physicians are in it as well. We'll send out a little information like, 'Elective cases have been cancelled because of the impending storm if you have any questions, come to the EOC for more information.'

Katrina came and here's what was learned and changed since Katrina...our levels of communication are this: we have the normal telephone system, e-mails, and now my RallyPoint. So the RallyPoint was put in place after Katrina. If...that goes down, we have these Cisco phones. This Cisco phone right now is supported by AT&T. If AT&T goes down...these will operate within house...We can still call and announce throughout the hospital...We have handhelds...handheld telephones that will continue to operate within house...cause they're supported internally...next level is we have a little over a hundred hospital-issued cell phones. Even with Gustav, which was in '08, you know, [at] our department head meeting...our [CEO] did this and said, 'Does everybody know how to text?' because that is something in our plan. We say if phones are down...the next thing is you can try [is] to text...and everybody said, 'Yes, yes, yes.' And then he stops the meeting and says, 'Everybody send the person next to you a text, right now.' I knew how to do it, but [other] people struggled. And he says, 'We are not leaving this meeting until everybody can prove to me that they've texted.' So we did that.

So next, we have three 700 MHz and 800 MHz radios. So we could communicate with the EOC, with the different components of the EOC...Police...Parish and the Regional coordinators. So we have three of those. Then we have three satellite phones as well. Now all

of these are redundancies but...if those go down...the next thing is we have 20 five-watt radios. They have...we tested it as far as the number of miles...what we do with these radios is we could communicate...and we have 20 of them so we could issue them out within house. If things are really bad, everything's down or we can't use these phones for some reason, it's 20 people throughout the facility that have it. What we do is this...a lot of physicians will ride the storm out with us and they may want to go back to their house after that and stay there, kind of clean up their yard. What we saw in previous storms was this...we had someone present in the ER because they're using a chainsaw. We needed a surgeon that was on-call and his cell phone's not working that well. The surgeon just took it upon himself, like every two hours, to drive back to the hospital, 'Do you all need me?' 'No.' And he'd go back. Well, with this radio, it's one frequency, so all the surgeons...everybody can hear, but you're going to hear, '...We need you in the ER. You have a patient. Do you copy?' Puts his...chainsaw down, whatever he's doing, and he comes on in...So those radios work as far as a mile, so probably five to seven miles. And...the last redundancy we have...we have two licensed HAM operators."

Respondent 3, Facility 2:

"...satellite phones...our antenna blew off the roof. And we didn't realize that that, of course, would happen, but we've replaced that [antenna] with one that we can take down and put back up right after the emergency...right after a storm, if there is one. So we've got better sat phone capabilities, got better radios in the county. And cell phones are still cell phones. Everyone's got their own phones. And actually, that's probably better, because that means that you have a variety of providers. I mean they all tried hard, but it really was...it really was almost 14 days before we had coverage...when the emergency people, the emergency operations in the county, switched over to Nextel because Nextel has that reputation for being with

fire departments, 'push to talk,' and you had all that nice capability. And so the hospital, police, fire department. . .most of them had switched to Nextel and Nextel basically just abandoned us completely. It was two weeks before you could even think about making a call on their network. When I called their 800 number to say something about it, the first time we had a decent signal, the lady said, 'Well, I'm sorry sir, your zip code is not in the affected area.' I suggested they check their map. But they ended up trying to sue us over the bill because I refused to pay for the 14 days of service when I had nothing. They tried to sue us over it and I just said, 'Okay.' When I got that final call from the collection guy and he said, 'Well we're going to have to take you to court on this,' and I said, 'I'm going to love it.' I said, 'As a matter of fact, the TV station is right here.' They were here doing an interview for something else. I said, 'The TV reporter is right here. I'm going to go out and tell him Nextel's going to sue us over this bill now.' And then [he said] 'well...wait a minute, wait a minute, wait a minute...'"

Respondent 6, Facility 3:

"...communication was as good as it could get at that point in time. You know, not everyone's going to walk around with satellite phones...I worry more about communicating within my department. We have walkie-talkie type phones at this time that allow us to communicate well. . .the house supervisor has that type phone...engineering has that phone, you know. We actually have two different walkie-talkie type systems in the hospital that can be used."

Respondent 8, Facility 4:

"I think some of the big gaps...I think number one is communication by far. I think the whole Katrina mess was a lack of communication on every level from local, from even the hospital side, up to the federal government and when I look at communication, there were things that I think we could have done better. We were in a huge facility...probably a million square

feet...it's huge, multiple buildings. The communication was not always there. Number one we didn't get a lot of communication from the outside at all. Typically, we were pretty paralyzed with that, but internally, I think communication could have been handled somewhat differently and maybe more frequently from, I don't want to say the administrative staff, but the people that knew what was going on and had the responsibility to coordinate all the efforts. So I think, you know, that was one big thing. I think when people don't hear a lot they assume the worst and probably by Thursday, people, whether it was staff or visitors...we had about 2,000 people in the facility...probably close to 400 patients, maybe 600 staff and so the rest were family members...people from the outside community and all that came there. So, again trying to take handle of all that and keep those communications going was a very big challenge for us."

Respondent 9, Facilities 5 and 6:

"...800 MHz will be gone by the end of the year...700 MHz is the standard now...The people that are on incident command [receive the radios]. And they receive those and then we have, for...department to department, and for the principals in the incident command, we have little two-way radios that are good for...three to five miles that they can communicate with whatever support functions report to them. Those are post-Katrina. They were bought with ...HHS [Hospital and Health Services] had several grants and communications was one of them. Matter of fact, participating in HHS grants, if you participate there's a set of criteria you have to meet. One of them is that you have to have at least two 700 MHz radios. The idea being that you probably have one in a central communication standpoint, and one would be for your incident command, at a minimum. . .on this campus they totally lost communications because they lost their telephone switch. On the XXXX campus we still had some land lines that worked. The phone in my office worked the full time. It never went out. My cell phone never went out.

We did have a satellite radio, telephone, which was sporadic. I think some of that was probably due to atmospheric conditions, some of it was probably due to the user, just not being familiar with that. We still have satellite radio, that satellite radio's capable of doing both voice communication and data communication. During Katrina what happened was that we would, through satellite or through hospital police, you know, just two-way radios that we had, that we could communicate from one campus to the other, is that we would get the status report from this campus down to XXXX campus and then because we had a landline...And that's the way that most of that communication went on at that time. We did have HAM radios. Now, since then, we have...a volunteer ham operator. Since that time, XXXX has installed two HAM radios in every XXXX hospital."

Respondent 10, Facilities 7 and 8:

"...it was a big problem for everybody...communications. It was worse for the XXXX than for here at XXXX. Here they had a landline phone, analog phone. Interestingly, when the phones failed with the battery backup from the digital switches, I'm inferring this, I'm no phone expert, but the analog failed...the rotary dial worked and we actually had a couple of those here...down in the switch room. XXXX didn't have them and I can give you the long convoluted thing cause the communications deteriorated by the day. At one point, the federal government was on Sprint circuits, that's the federal telephone system. Sprint had a big node here that flooded. It was out completely. So they had to make long distance calls and the only way they could make long distance calls when the local phone service failed was to have a calling card. Nobody had any more cell phones. Everything was closed in this area. Every store was closed. I had somebody in Washington go to a Wal-Mart and buy me calling cards with minutes on them so I could call in the numbers. That lasted about a day cause then the local

lines failed, and at the time we were actually evacuated from XXXX, we were communicating by police band radio with a XXXX clinic in XXXX who was calling me in XXXX on a cell phone. I didn't have landline communication. I was calling Washington on my cell phone or texting on a Blackberry, which was very intermittent, by the way, and they were communicating through an Air Force base in Illinois with all patient information. We were getting a tail number for the plane who was gonna pick those patients up out of the airport. There was a long convoluted stretch...communications were terrible. People had handheld satellite phones. They didn't work. The theory is overcast, helicopters, not a bandwidth with all the traffic and everything. We found out that cell phones from other area codes might work when yours didn't...different carriers would work. There was no rhyme or reason to it. So what we have now...we have a fixed satellite system on the roof that is hurricane-proof that we prepaid...hard to buy satellite bandwidth after something like this happens. You have to pay for it up front, pay for the bandwidth up front, so you've got time on it. That's what CNN, and everybody else were doing, they're sitting down here broadcasting up the street here. Sanjay's running around and all that sort of stuff.

So, satellite communications, we have cell phones from other area codes, we swapped. We have HAM radios, with trained HAM operators...plus, and I'm not sure of the frequency of this, but the state has used monies, it got emergency preparedness monies, we now have radionet where we're in contact with emergency services, other hospitals, and we have a statewide radionet that will work when all else fails. I'm confident we have communication covered where we didn't have it before, and all hospitals have that now."

Respondent 12, Facility 9:

"...communications was huge during Katrina or the lack thereof, because no one...our

plans did not call for us having to stay within a facility more than 72 hours, not having to be without power for more than 72 hours. However, we had the front-end covered in regards to communications. We didn't have the back-end covered and that's what we were talking about earlier, that's where thereafter we decided to purchase satellite radios and satellite stations to where we wouldn't have that as an issue.

...in terms of communications planning, because one of the problems that they had with the evacuation last time was that there wasn't good coordination between the staging area and here. For example, if they needed an advanced life support system ambulance for a given patient. Here, they thought that ambulance was coming, they'd bring the patient downstairs at the front door, and wrong kind of ambulance would show up...or the ambulance would show up and they'd say, 'Okay this patient is going to XXXX.' Then the driver would say, 'Well, my orders were to go to XXXX, and I'm not going anyplace else.' Yes, that patient has to go back upstairs while another ambulance comes...so, a couple of things that we've done is...we now have a land use agreement where Target and Home Depot is for an ambulance staging area. Those property owners have agreed to basically outfit this to help support those ambulances while they're there. So, we are here and we've got XXXX Field here for fixed wing and we've got a heliport here for rotary aircraft. And so, you've got ambulances basically coming to the front door...so there's patients going out the front door, there's patients going out the back door for helicopters, then they are going here to XXXX Field getting on fixed wing aircraft or they're going across the XXXX, you know somewhere. At this staging area, one of the things we're going to do now is when we're gonna trigger that evacuation, immediately they'll put in the request for a medical incident support team and they are going to help in the coordination of the movement of the ambulances. We're going to put somebody from...County EMS in our

command center and the other thing that we found was, you know, if an ambulance shows up from Maine, there's not a good chance that they're going to be able to reach us for communication. So in that initial request, too, they're gonna bring in a special piece of equipment that basically takes whatever frequency that message is coming in on and then retransmits it on our intra-operable frequencies so it can reach our incident command team. So with this in place, we're going to reduce the number of the wrong kinds of ambulances that show up."

Respondent 13, Facility 9:

"Communications? Yeah, I think we did the best we could. I can remember when we called the state emergency operations center the morning after the storm to tell them to send the disaster teams and more water. We had to stand up in one of these windows to get a cell signal. That was sort of the only place on campus that you could get a cell signal. So, communication with the outside world, we made it work. You could go to certain points like that to get a cell signal and still talk to people. Internally, we tried to get people to stay connected by sending a runner to the command center, you know, on a frequent basis. We had twice daily staff briefings for the staff that were on campus so that they would know what was going on. [Our CEO] led most of those. He would be there at a certain time in the morning and a certain time in the evening and people would know to go there for those briefings. The emergency operations team met every morning and did the same thing, and then every evening for a while, then it just became every morning for most of the time. We made communication work without a lot of tools that we were used to before the storm...we had satellite phones and have those connections now. They've been beefed up some since Ike. If we set the emergency preparations center up, there are two or three satellite lines on the desk phones that are in the operations center...our IT folks have a remote site, I think in Dallas, where the data warehouse and everything's backed up.

...hardened against most anything...the plan is to have some of our public affairs staff there to be able to send messages out. We did a lot of that after Ike, sort of on the fly. I think it's more formal now."

- **Meaning Unit # 9: How has the economy impacted hospitals' ability to improve their infrastructure for a future emergency or crisis?**

Respondent 1, Facility 1:

"If you're going to accept these [grant funds] you have to have these NIMS criteria. Well, we met those. But once you get those dollars, like we got about \$16,000 this year...you're required to spend them in certain categories. One category is going to be surge capacity, so you have to purchase beds. Another might be in...PPE, Personal Protective Equipment...and that's going to be respirators...cause you can't just use these dollars and say, 'Hey, I'm going to go get...' whatever. It's got to be emergency preparedness. You could go buy radios with it, but you have to submit your requisition before, 'Hey, this is what I want to buy.' They [XXXX Hospital Association, HHS] have to approve it. And now the state has guidelines and they say every year, you know, by 2012, for your size facility, you have to have 90 extra beds, surge beds. So they might let you spend all your money on communications during the years, but you better have come up with your own funds to get your beds.

But, here's why I'm positive it's [the economy] affected other hospitals. For the first year...those HHS funds...it's always been a grant. They give you the money up front. You tell them where you're going to spend it. As soon as they approve that, they send you the money and then you buy it. And then you show them the receipts that you actually purchased that. This year, '09 was the first time that it changed to reimbursement. Now these funds that they give us, our size facility, which is one of the bigger ones...we got only \$16,000 to \$18,000. So, you know, it's a lot of money, but really, it's not a lot of money for a hospital. So we spent those

monies. Now, it changed to reimbursement and there was at least a 5% match, which meant you had to spend at least 5% more than you were given. So they wanted hospitals to have a little skin in the game. And there was deadlines for when you had to say do you want the money. . . yes or no. You had to spend the money, at least five percent more before they sent you the check. Well, we got a call right before the deadline was coming saying, 'Hey, we have an additional \$17,000.' I said, 'Well, that's all we got in the first place.' They said, 'Well, several hospitals have decided they do not want to or cannot match. . . put the money up front, nor do they want to match.' So they say, 'We're going to forfeit the funds. Do you want it?' and we said, 'Absolutely!', because we got what was basically free money... So they said, 'What other emergency repair and equipment?' and we say, 'Hey, we want our own tent...' Here our after-action plan was we had to call an outsider... to bring a tent to us so we could triage patients in the parking lot, then get them into the ER or just send them on their way. Well, now we have our own tent. We have our own hospital tent. And we bought one from the same company that had purchased the regional one. So, if there's a major issue somewhere in our region, the regional tent that's bigger is somewhere and we have connectors so we can go and connect to that tent... it's almost like wings in a hospital. So, then all of a sudden you have this 40 x 40 tent and we attach to the side and you know a 20 x 20 tent that we could put 20 more patients in."

Respondent 2, Facility 1

"I grew up in hospitals that were turn-around hospitals that had hard decisions... they just didn't have the resources to do a lot of things. So our hospital has continued to be really strong financially. We have no debt. We have 400 days of cash on hand and we've actually increased our cash reserves within the last year. But, it's where these things lead you that worry you about the cuts; there's more of them coming, can you sustain them, and so forth. It is a—it is a

concern. These hospitals that are financially marginal, they're on the edge all the time. There's a hospital in this area, pretty close by us. For example, this morning one of our nurses in cardiac rehab lives in that town. I just asked her how it's going over there and she said, 'Not so great over there.'...she doesn't work there and she lives there. They're guaranteeing the staff...the OR nurses...40 hours. They don't have...they're not hardly doing any surgery and then they guarantee them 40 hours if they don't leave, in other words. And we haven't gotten any of that."

Respondent 4, Facility 2:

"...if people weren't a problem or money wasn't a problem. The reality is...money and people are going to be even more of a problem with some of the stuff that's going on with healthcare reform as things evolve with that. And I don't even know if we know yet what the impact is going to be, but we've already seen facilities reducing their staff and doing what they have to do to...stay viable. So I can assure you, that's not enhancing anybody's emergency preparedness posture. And I mean that's just the cold, hard facts. So, you know, you can't have it both ways...it's kind of the healthcare business. I've been in it a good while now and...I don't think you ever get to do anything to the degree that you'd like to do it, to the degree where you say, 'God, I did a nice job with that.' I mean you are flying by the seat of your pants all day, every day. And it's almost an art, if you will, and I think those folks [the people that are successful] are the people that are savvy enough to understand what's important and what's not or what's more important than something else...So you wear a number of different hats, but there's lots of different opportunities to screw up if you misstep. And a key to that is having good people that know, that have common sense and go, 'Okay, I know this can wait and this can't.'...so there's a lot of juggling that goes on and the reality is, you have to manage your priorities and everything isn't going to get done."

Respondent 7, Healthcare Association Executive:

“When you’ve got almost half of the hospitals in the state that have a negative margin right now, you know, at the end of the year they show a negative margin on the financials ...somewhere between 43% and 46% of the hospitals. Around 60% have either less than or equal to one percent margin, right now. And it’s that margin piece that funds the generators... on top of the CT scanners that you have to upgrade and everything else that you have to do.”

- **Meaning Unit # 10: What are some of the physical plant modifications, mitigation or improvements you have made to your facility post-Katrina?**

Respondent 1, Facility 1:

“Pre-Katrina and post, we had the same amount of generator power. We’ve got three different generators...Joint Commission requires you to have your critical branch...on emergency backup power...It’s got to come up within a few seconds. Critical branch in most hospitals, if you walk around you’ll see there’s red outlet plugs. And those are going to be the ones that are going to have to be on. Backup generator power. We had 100% of everything in the hospital on emergency backup power...Gustav was a good example because Gustav hit us harder than Katrina...we lost power pretty quickly. And we were on generator power for 82 hours...if you’re inside our facility before, during, or after Gustav, you would think it would be a normal day. The HVAC, the air conditioner, is working just like normal, all the lights are on, all the equipment.”

Respondent 4, Facility 2:

“As far as our emergency preparedness...once we get through this project that...we finally have approved, that is up for bid currently, we will be in as good a shape, from a flooding perspective, as we could possibly ever hope to be because we’ll have a floodwall...literally have a floodwall around the facility with flood gates and those things that aren’t will be elevated

to protect them so that we, should it flood again, we won't have to worry about it as much. Of course if it's a bigger flood, then we've got a problem. But we have, of course, replaced all our equipment and we probably, no doubt, have better equipment now than we had before. And we had good equipment before.

...probably the most reliable communications that we had were the handheld Motorola five-watt radios, and we have increased our inventory of those substantially cause those things work...when nothing else does, they work and for a pretty good distance too...I mean it [communication] was gone. It's been interesting. I've done a bunch of interviews since that and people just don't even grasp that—they can't even grasp the notion [of being without communication].”

Respondent 5, Facility 3:

“And what we do here is...anhydrous ammonia, for example, if there was a significant anhydrous ammonia spill and it was such that it was going to be coming our way, then disaster was imminent. We have a button, a single button, in the plant that can be pushed down to all the air handlers that you don't have anhydrous ammonia getting into the building. Never had to push that button, don't ever really want to push that button. It's not something you do cavalierly cause it creates a mess; all those air handlers have to be individually and manually reset, but we could do it if we had to.”

Respondent 9, Facilities 5 and 6:

“We've added generators, but we've changed the way our generators were configured for one thing...which now gives us capability of running, like I said, all the air-conditioning and probably about 30% of all the power in the hospital.”

Respondent 10, Facilities 7 and 8:

“We have put in better electrical generation capacity in this hospital and putting extra generators on the second floor in one of our parking garages, extra fuel storage and taking our main generators, which are on the first floor and putting them in a...well, we raise them up, we build a bathtub around them like a floodwall. They used to be air-cooled...with the floodwalls, they don’t get enough air so we had to make them water-cooled...and to have constant access to water, we drilled a well. That well also allows us to flush toilets. We don’t use it for potable water, but we could use that water if necessary to flush toilets...We can’t run the whole building but we can support 500 people in here and keep them in air conditioning and we can do it for the better part of a week. We can do rolling brownouts and all sorts of things. We can keep it habitable here, which it wasn’t then [during Katrina]. So we’re better prepared from that standpoint.”

- **Meaning Unit # 11: What measures did you take and are you taking to ensure you have enough fuel, water and power?**

Respondent 2, Facility 1:

“We took care of 70 or 80 patients with bottled water for two or three days. So that shows you the resourcefulness of the staff...the people that work here. But it also shows you that you can get stuff in here. So we weren’t nearly as worried about things like food or pharmaceuticals or diesel fuel or other supplies, not nearly.

I will say this though, to me, one of things I have learned about hurricanes is...you never know what to expect exactly. And I’m sitting here saying we’re going to have those supplies, but I say that tongue-in-cheek because depending on how a storm works. And you know, we had the eye...the hurricane was just a few miles from here and it wasn’t near as destructive as some

others. So you don't know what they're going to do and what they're going to interrupt, so you just really have to be flexible.

The only thing we're thinking about is this...it's a water tower—our own water tower. It's about \$1 million dollars and...We have a...water tank. But I'm talking about something like the cities have. And we've come within a hair of building one of them...you know you have to circulate the water, keep it fresh. . .but you would have your own water supply. So you'd have to shut it off when the storm comes so you can preserve the water that's in it just in case you needed it. Water's an important resource. So that's...that's the thing on my agenda. We haven't taken hardly any money, just a little bit from these grants or whatever that are coming along. That's one however, if somebody wants...if you wanted to get a million dollars from the government, it might be well spent.”

Respondent 3, Facility 2:

“...The generators will be raised as a part of this final big FEMA project. We hope when it's all said and done that we'll have the capacity to run chillers next time, but we don't know. The chillers and boilers and stuff will be protected by the flood wall.”

Respondent 4, Facility 2:

“...there's been another burst of grant money that's been distributed out to the states for emergency preparedness...and, in my opinion, has done a really good job with standardizations. They didn't just give the money to the hospitals. What they've done and what they do is if there's a need for something, I may not get the one I want, but for example, we've received, gosh, all types of protective equipment. We've received some negative air machines and what they've done is they've bought the same equipment and distributed the same stuff to every facility so that we're all working with the same equipment. So, if XXXX is in trouble down

the road and they need some help, my folks can go down there and work because they're familiar with the equipment.

I think Katrina opened everybody's eyeballs up. So, from that perspective...we now have a commercial decontamination unit that we didn't have before. We just had a homemade deal that my guys and me designed that got us by for years. Now, you know, we have state-of-the-art stuff. We have lots of personal protection equipment. We have that staged, not only at the hospital here, but we have a clinic at XXXX that we have the potential for. It's at the industrial complex out there. We have the potential to get hit by God only knows, so we're pretty well prepared with that regard. So from that point of view, I think we're in pretty good shape.

And one of the things we did after the storm, one of the huge problems was...every one of us lost our car because it flooded out here. So those that did have a vehicle or transportation ...and were willing to come back and help, couldn't because there was no gasoline available. So, we bought our own 500 gallon tank of it that we keep...right now our back up is bottled water and water that we have brought in. We have a supply of that we keep on hand and we'll continue to do that but...by the end of the month we'll have two four-inch wells tied together with a chlorinator. And so we'll have...backup capability for water to a point that we could drink it if we have to."

Respondent 5, Facility 3:

"...we have, for what it's worth, two 400 KW generators, two 800 KW generators, and three 1500 KW generators. We can run the entire hospital wide open with the three 1500 KW generators and one 400 that we use just to level out some peaks that occur from time to time. Now, when you do that...you burn 6,000 gallons of diesel a day. We store 24,000 gallons of

diesel on-site. And you're talking about a lesson learned during and after Katrina, it is this...just because you can run the building wide open, doesn't mean you should...run the building wide open. So we have some shut-down protocols now. You have two CTs, two MRIs...you don't need two CTs and two MRIs. You need a CT and an MRI. You have two chemistry machines in the lab. What we do is start shutting down some redundant equipment so that we pull down the power load. We tell people, 'Turn off the lights. You don't need to run the lights up.' We're going to increase the air temperature just a little bit and all of those things are just to kind of pull down the load that the generators are under so that we conserve fuel. We can go four days...and we made it with no problem at all. That's key one. Key two...we're connected on a direct connection to a city well. That city well is on our standby generator power so that we can have water. Not only do you need water though, and people tend to forget this, to flush toilets and to prepare meals and to drink and all of that kind of stuff. You have to have water to run chillers. If you don't have water supply in most healthcare facilities, you have no air conditioning. So you can have all the power in the world, but you still won't have air conditioning and facilities, especially if you talk to New Orleans where they had all kinds of troubles...these buildings are not made to be operated without air conditioning. It gets very hot and very humid very quickly. And it gets to be an unsafe place to be...our protocol is that as a storm is approaching, we're monitoring the power coming in from the power building. We know what's going on with the power and you begin to see fluctuations. Experience says, 'We're getting ready to lose power.' And...the few times that we've had to do it, I get a phone call from the plant and they say, 'Listen, we're beginning to see some squirrely things on the XXXX transmission lines. We've got a feeling we're not going to have power very much longer. If it's okay, we're just going to go ahead and shift over.' So we just go ahead and switch over to generator power, that

way you're doing it in an orderly fashion...as opposed to chaos. And we go ahead and switch over.

...one of the things when you're going through a disaster...you're just doing what you need to do. After the hurricane, that's where your plan...your recovery plan really begins to be important. We had employees who said things of us like, you know, 'It was like they had thought of everything. And whenever we had a question, they just had an answer.' And, 'Can't believe they were that prepared.' We weren't. Your plan is the guideline. There are going to be things that happen that you didn't anticipate. So you have to have a good enough group that's flexible enough to brainstorm answers, you know? And it's kind of a little bit like the *Wizard of Oz* every now and then, you know? We're back behind the curtain figuring out stuff before we can walk out and talk to people. And I'll give you an example, since my name can't be used. We were holding 9 a.m. and 3 p.m. briefings to our management team every day, post-storm, and did that for a long time. We held those briefings for two reasons: (1) to communicate with them and what we knew was going on and (2) for them to communicate with us what they knew about things that were going on...One of the directors raised her hand and she said, 'We have a problem brewing.' ...'Gas is very difficult to come by and I have people that are driving back and forth to work. I'm concerned that if it comes down to 'I'm going to run out of gas or I can have gas and just not go to work,' they may choose not to come to work.' I said, 'Okay, we'll see what we can do.' ...Called my engineering folks, said, 'I need some gasoline.' ...About 3,000 to 5,000 gallons...They called me back a few hours later and said, 'Alright, we've got 4,000 gallons of gasoline coming in.' Oh, good. 'The problem is, we don't have anything to pump it with.' I said, 'Well, you know there's a gas station across the street from the hospital. Convenience store gas station, I know he's not pumping gas, but he's running his convenience

store.’ ‘Well, he’s got no power to the pumps.’ ‘So why don’t you guys go over and talk to him and ask him if we can use his pumps?’ ...Long story short...we put 5,000 or 4,000, however many gallons of gas it was, in his tanks. We had power to his pumps. Then the question became, since gas is so short, how are we going to dispense it to employees without creating civil unrest?...We did it all after curfew hours...Now, we only did that three or four or five days until the immediate crisis was over and then things settled down. The point is...that wasn’t in our emergency plan, neither was having a washer and dryer for employees in our emergency plan, but we rigged that up as well and opened our own laundromat here so employees could wash what few clothes they had. You have to be flexible.”

Respondent 8, Facility 4:

“Again, many of the hospitals now in the city have wells, several of them have built, you know, dug wells to have that access to water in case we needed [it] to flush toilets and those type of things that you need water for. So, many of them [hospitals] have built wells. Some hospitals, I know one in particular, have purchased a large supply of MREs and those I think you can store for like 25 years they’re good for or something like that, which is a long time. So they have purchased those so they will have that ready.”

Respondent 9, Facilities 5 and 6:

“The other thing we’ve done, we’ve increased our fuel supply...we now have a, well it’s a minimum of seven days, and that’s a list of our generators there...and, like this building, I could run this building for 35 days based upon the capacity I have...and most of them are about 15 days. Hospital is about 15 days. The theory is that after seven, the reason we have seven days is that after seven days, anticipation is that you will either one of two things, you will either evacuate or...or the city will have recovered and you will be able to get...back online

or get additional fuel brought to you.

We do not have a well. Our power you know, our air-conditioning, our chilled water, and steam comes from a third party. It comes from a district thermal plant that serves the whole medical district...We keep backup water, drinking water on hand, and then if a hurricane's in the Gulf, you know, and looks like it's going to strike, we bring in additional water, plus we have an agreement with our water vendor that 48 hours, H minus 48...he actually brings a truck filled with water and parks it on our emergency ramp...as a backup to what we already have in-house."

Respondent 10, Facilities 7 and 8:

"So, logistics, you need to take care of that. Of course, you need to have the right supplies in the hospital so we have everything from like kitty litter—do you know what kitty litter is here for? Human waste. That's what we used it for...things like that, supplies, and stuff like that."

Respondent 12, Facility 9:

"...we have a major mitigation plan that I'll tell you about, but until such time as all of that mitigation is done, in a nutshell, the mitigation is you raise critical infrastructure up 25 feet. You don't have generators on the ground. You don't have any kind of critical infrastructure on the first floor, and so forth. Once that is in place, it becomes a little bit easier for you because you have a higher confidence that your facility can handle the patients, not only on the landfall [of the hurricane] but then in the days afterward, okay...I think it'll be another two years until it's all in place. Right now, I think you have to err on the side of protecting people by evacuating them if it's the case that we're going to get a major hit, okay. Whether you shelter in place, or you evacuate, part of the response is an alternate provision of healthcare. So, typically what

might happen here is there would be a small contingent to protect the workforce that's here.

There would be...based on the scenario...there would probably be a small team here to provide urgent-care-type, emergency care in a sense that you would do it like an immediate treatment and then ship them off right away to a hospital. We do also have as part of that RAC, Regional Advisory Council. They have a portable hospital so it is possible that could be set up... somewhere...right after the landfall. In Ike, they used a Disaster Medical Assistance Team, a DMAT, which was brought here. In essence, it's got to be sort of a regional response to providing that care until such time as the infrastructure is back in place here because even if we are in, you know, pristine condition...if we don't have water, waste water from the city. Additionally, if we don't have electricity from XXXX Energy, we pretty much won't be taking care of patients. I mentioned, too, in terms of response to the disaster response contractors, we also have insurance adjusters coming down here right away. That insurance helped, you know, and ultimately, it was the decision of the legislature to say, 'XXXX needs to be back here.' They needed an estimate of, okay, what are the damages, you know, what is it gonna cost to bring XXXX back up to some level and it helps to have, in presenting that information to key legislators and the governor's office. It helped basically to say, okay, we've got this much insurance. We anticipate this much in FEMA Public Assistance, so this is the gap. If we come back to a certain level, this is what it's gonna cost and ultimately, you know, it's the state legislature saying, 'This is the money to reopen.' So, for recovery basically, you have to rebuild damaged facilities, incorporate mitigation measures and our mitigation plans basically, you know, in the hospital there won't be any critical facilities on the first floor. Any new construction is going to be planned for 25 feet below sea level flooding, so basically, all the mechanical and construction so forth is above the water line. We just got word, too, that

probably one of our mitigation projects was to build a safe room. This is essentially something that could withstand a category five hit and we haven't gotten word yet from FEMA but we've heard from the state just last week that it will probably be approved; therefore, the concept being a building that could withstand a category five that would hold about 500 or 600 people. The original plan was for first responders from XXXX and XXXX and it gives you another option, right? I heard from our Regional Liaison Officer on Friday that Texas has a new program that's called the Texas Storm Shelter Initiative, TSSI. I looked on the website and I couldn't find anything written about it yet...the idea being that you can keep spending millions moving buses and saving buses and maybe using them, maybe not or you can building something that's going to survive...Then, at least reduce the numbers of people that you have to bus. Ideally, it would take care of all of them but, you know, at least reduce them."

Respondent 14, Facility 9:

"Well, some of our buildings, the newest building is the XXXX building, which is just an incredible facility. There are very few like it in the country, much less the world, and it was designed with this risk in mind, and so it suffered no damage. It got a little water under the outside set of doors...on the floor mats and that was it. It functions as it should have. So we know going forward as we construct new facilities that we can build them to be storm-proof. But what do we do about the 120 year old XXXX building? Well, you have to let the water wash through that one. So move critical functions up to 25 feet or higher, put in impervious...building material advancements and technology out there that are just incredible ...but, put in electrical circuits that can be disconnected, if you will, from other circuits in the building. There are some impervious wall materials now that can handle flooding and water. Floor materials that are the same...hose everything down, sweep it out and it's ready to go in a matter of a day or two. So

we have the opportunity in some of our older buildings to do something like that...So we let the water wash through. The lower spaces in those buildings will be public spaces with movable furniture and files. We know when a storm is coming and we'll move them...some of our buildings can be well protected with some floodwalls and flood barriers at the entrances. So, we have a variety of mitigation strategies based on location and type of building.”

- **Meaning Unit # 12: How does your facility handle staffing matters to ensure successful operation during a hurricane event or crisis situation?**

Respondent 1, Facility 1:

“...in the years that I’ve been here, we’ve done it [staffing] two different ways. One, we had a meeting prior storm, kinda look at the storm saying, ‘We don’t think it’s going to be that bad.’ We’re designating...going down by the departments seeing who are the essential departments and who are the non-essential. Non-essential are basically broke out this way...if you are not a direct patient caregiver and you are not a 24-hour unit...and we’re not going to have any patients in house, then you leave. And you...and the understanding is...it’s in our policy...you return once the roads are open again to relieve. And then everybody else, you’re going to be a storm rider. And long before hurricane season, it’s clearly communicated to each employee...You’re going to be storm rider, you’ll be A Team, you’ll be B Team. And we are...I guess we have to be this way, we’re...we’re very tough, for lack of a better word, on once you’ve committed to be a storm rider, and it gets close to the storm, we call, we say, ‘We’re getting close to sheltering-in-place, get with your plans,’ who’s agreed to be here and your name is on that list. If you don’t show up, unfortunately there’s been terminations after because we’re relying on you to take care of a patient and at the last minute you decide, you decide, ‘No.’ So it’s pretty strict. I think it has to be. Cause you have patients relying on you.”

Respondent 5, Facility 3:

“We have a Hurricane Team and we have a Relief Team. For the most part, Security Department...they’re all on the Hurricane Team. Engineering...all on the Hurricane Team unless there’s some reason that you can’t be. Other than that, you bring in people enough that you can run your department 24 hours a day...we run those on 12-on, 12-off shifts for the hurricane people. We have about 2,800 employees altogether. Everyone else that’s not on the Hurricane Team is on the Relief Team. Now, as you well know...2,800 includes a lot of part time, PRN, and people that never work and all that. It begins at employment. That it is an understanding that there’s certain responsibilities associated with hurricanes here. We try, to the degree that we can, to have the Hurricane Team be 100% voluntary. In areas like Security and Engineering where you need all hands on deck, I’m sorry, you just got drafted, part of the job. In other areas, I have directors who will, when they’re developing the Hurricane Team, they’ll look for volunteers first and then they look for people who don’t have small children. Single people are great. People whose children are grown and moved away, those kinds of people that can stay here and have the least amount of hardship possible. But also you have to have quality employees here. So you have your Hurricane Team and you have your Relief Team. There’s one very, very clear understanding here at this hospital and that begins at employment: If you’re on the Hurricane Team and you don’t show up, you just lost your job. If you’re on the Relief Team and you don’t come back, you just lost your job. It may sound cold, may sound hard ...We’re not kidding about it. We are very serious.”

Respondent 8, Facility 4:

“And what happened with us, we did have a team A and a team B, and a lot of the team B did come in because they just did. I had been at that hospital for 32 years. We had gone

through many hurricanes and some that we had to stay, maybe the most I would say, two nights that I can remember that we ever stayed there. So, we just brought in a couple extra people in case, so the staffing was fine. There was no problem with staffing. We had enough staff to take care of the patients for those that week there. I do think that it is a very stressful thing and one issue that we dealt with, with staffing, was definitely people that were on the A Team that could not come in. I remember one example we had, her husband was a policeman and was called to work and she had like five little kids and she was on the A Team. Those types of situations we had to deal with pretty much, some were out of town, they couldn't get in, it was too late before evacuation. But, I think now most of the hospitals, especially after Katrina, and I'll just tell you something that isn't really, in my opinion, too good. After Katrina, some of the hospitals in the city, including the one I worked at, had developed policies on how people would get paid, and if they were on the A Team and they didn't come in, then they might not get paid, and some hospitals terminated people. I remember I was in Houston at the time after Katrina and working with the HR person, because managers were giving lists of people that should be terminated and shouldn't be, and that was a very difficult thing. I'll have to be honest, some of them I overturned and I thought this was ridiculous. One example was...the nurse with the policeman with the five children or four and another one that [had] just had a baby two months prior. I think many hospitals now, nurses have to, when they are hired usually now have to sign, you know, it's up front, this is our policy and you have to abide by them. I talked to a lot of nurses because I did again work in the hospital again after Katrina. Many of them will sign it and I guess it really depends on their situation, and I think as an employer, we need to make sure that we're sensitive to some of these issues. I know some of the nurses that worked at XXXX worked in hospitals when Gustav came. Many of them [managers] were very gracious and said,

‘Okay, you’ve just been through Katrina, you don’t have to work this time,’ and stuff like that ...I think from the staffing thing, that’s always going to be a big issue. I think people have not forgotten Katrina and definitely they were separated, many of them, quite a long time from family and friends, and so they’re not going to do this again if it would ever come to that case.”

Respondent 10, Facilities 7 and 8:

“What do you do with all your people? Some places laid them off, some people paid them, but you have to be able to communicate with all of them, regardless of what you’re gonna do. What I did at XXXX is I put them to work in other [hospitals] until I could get them back here. We paid our people and brought people back...lot of good will out of that.”

- **Meaning Unit # 13: Have you made any additions to your staff as a result of experiences with Hurricanes Katrina, Rita, Gustav or Ike? How did you handle difficult human resources issues that came up during and after the storms?**

Respondent 1, Facility 1:

“Each region...has a designated regional coordinator...that is an unpaid position. And that person is a full time employee at another hospital. Our particular one is a full-time employee at XXXX Hospital. So obviously, they’re going to be very busy during the storms. What region XXXX did with the help of XXXX [hospital association] two years ago...we said, ‘Listen, it’s really unfair for that person. They have their own hospital to worry about. We need some help...’ XXXX [hospital association] facilitated it and basically we came up with this: we said Region XXXX always gets these grant dollars and then it gets distributed by your hospital size...what the proposal is, and this is what happened, proportionately we’ll take money off the top from every hospital before it’s distributed. That money’s going to be used to hire a regional—a designated regional coordinator...we have one now...She’s excellent. It’s a hired position, that’s her full time job, what she does all year long. So, she’s our resource. She’ll

notify us about, 'Hey, listen, y'all need to be NIMS compliant; listen, EMSTAT needs to start meeting in May.' She's our contact point...So we took those monies and she's paid. This is her second year doing it and the plan is to continue to do it."

Respondent 8, Facility 4:

"I think during the event, while we were there, of course, everybody gave 150%. There were a couple nurses that might have gotten a little dehydrated or something, but as far as pulling their weight on everything, I think it was. The mental health issues come after, where people now have left. There's no more hospital. They have no job, many of them had no homes to go back to, many of them did not know where their family was or whatever, so I think some of them...are still receiving counseling, still having really difficult times. Many of them have changed jobs quite frequently trying to find that right place again. So I think many of them are still having difficulty with that."

Respondent 11, Corporate Healthcare Executive:

"Yeah, it's all pre-planned out and certainly is something that's covered with every employee, at orientation before they're hired, they know, if you're working in healthcare, you're essential, either here or you're essential elsewhere, but you're essential.

The other thing that we have is the XXXX Fund, where every employee within XXXX can contribute to this XXXX Fund to assist families and employees and their families in needs of disaster. I can't tell you how much that assisted lots of folks in getting through Katrina. We had people at XXXX that were literally out of work. We didn't reopen XXXX until February 14. The company left everyone on the payroll. No one was without a check. Whatever they were making before Katrina, they continued to make and get paid for...until the hospital reopened and there was a tremendous amount of financial assistance, resource

assistance, and those that lost their homes, didn't have anything, where other employees were assisting...not that that's unique to us, it's just, we have our own family, you know, within the company that we work for across the hospitals. So, I do think it's...we just have those additional resources that a single-standing hospital...just doesn't have because you don't have that larger pool of resources to rely upon."

- **Meaning Unit # 14: Explain how you conduct training and drills with your staff, teams. How do you determine which crisis scenarios to plan for?**

Respondent 1, Facility 1:

"There's a requirement with the Joint Commission that you have a safety committee ...And the safety committee is, by Joint Commission standards, required to meet six times a year. We meet....every month...You're going to go through reviewing of policies and everything. But one big component of it is...emergency management...we drill at least twice a year and the way...this committee, selects what the drill is going to be is, we...assess potential risk. And you go through and you look at, 'What are we most vulnerable for?' You know, ice storm...pretty low probability...things like severe weather, tornadoes or hurricanes...that is one of the components that we're going to drill, on a minimum, once a year. So with a Hazard Vulnerability Analysis...we assess the potential risk. One of them is for probability, how well equipped we are and we get a score...whichever area comes up with the highest score, then we say, 'This is where we need to drill because we need to be prepared for this.' Probably the one that's come up the last two years was mass influx of patients. So, outside of hurricanes, that's been the one that we've drilled on. Pandemic flu...There's two regional trailers for mass decontamination of patients. We bring that on-site. Plus we have our own tent, where we can—we can decon patients, get them into the facility without contaminating the facility. And we will run the drills here. The National Guard will come in. Their HAZMAT team will train us. And

then we don the equipment...We've got all those respirators. We've got the suits. So, everybody suits up and we...we pull people from...all different departments. So, we had nurses in there. We had respiratory therapists. We had maintenance folks in there. We had safety committee people...Here's what we did last year and it...kind of helps us hone our skills on many different levels. We did the flu shot, the regular seasonal flu this way and also we got the H1N1 vaccinations as well. We had, just prior, a year and a-half ago, we wrote our POD, the Point of Distribution policy...where are we going to route the people? Which door are they going to come in?...On paper, this thing looks great. They were like, 'Well we need to execute this.'...We always want to test our RallyPoint, our crisis communication system...for hurricane season. But...we also want to test this new POD policy, but then we also have and we want to give the seasonal flu shot. We want to alert everybody that it's available...We did it all at once. We waited a couple days before we're going to give the shot out, went through RallyPoint. We sent the communication, 'FYI: you know seasonal flu shots going to be offered at this point' and then when we gave it out, the team showed up to, to execute the POD policy to make sure the parking was in the right area and make sure people came through right area...We did it like a real like a real live exercise...We accomplished our goal."

Respondent 3, Facility 2:

"...we not only participate in the drills that are set up but we also have enough...false alarms of hurricanes and stuff that we exercise the plan quite regularly. The thing that...we've concentrated on is response to contaminated victims. Contaminated patients...we've done a lot more emphasis on that. We've trained many more people to dress out in the suit, you know, and be able to work with a patient who may have been contaminated and triage them, help decontaminate them and get them treated properly...we found years ago when the...it's just

funny what you learn...but, years ago when the anthrax scare was going on, we had somebody leave some white powder in one of the lobbies. And we all knew it was powder, but we decided, let's go ahead and report this to the local authorities and see what happens. And so they went through the whole thing...and the firemen came and dressed out, all of them. They took our employees out that had been exposed and decontaminated them. But as the firemen dressed out, one of them responded into the room and then realized that you can't use your radio unless it's outside the suit. So, you know, you've got your radios and your phones and everything in your pocket, strapped to you, put the suit on and then you get in the room and just like 'Oh, gosh. I can't talk to anybody.'...you talked about lessons learned and I said that was years ago. So as we've gotten more experience...actually in the hot weather, responding in the suits...in the decontamination suits, you only last about 20 minutes."

Respondent 4, Facility 2:

"And our drills, we're required by the Joint Commission to have two drills a year because we have an emergency department and one of them has to be an authentic receiving patients kind of thing and I think we've already had three this year that we've done. Of course, we used the oil spill because the county activated their EOC and in fact that's still going on.

We have the classes going on...and there's a lot of drills that we've got to do...the fire drills, the emergency preparedness drills. And, you know, does everybody know every aspect of the plan? No. But one other thing that we do when we exercise the plan, is we...again this is reflective of the administration...is the last couple of drills, in fact, the boss has said, 'Okay, I'm not going to be the incident commander. I want you to be the incident commander.' And one of the nurses will take it on. But, you know, it's a great opportunity and that needs to happen...it gives them confidence...that they know what they're doing. Do we make mistakes? Absolutely.

You're going to make mistakes...and after every Joint Commission, again, in all of their revising of the standards, they've got it locked down pretty tight so that you have the drill, you have to document to enforce your drill, and then you have to document your lessons learned or your opportunities for improvement as well. And then when the next drill comes around, you use those things in planning your scenario to say, 'Okay, this is the risk we had last time. If it did, let's test them.'...as much as I gripe about The Joint Commission, if I were going to design a plan...that would probably be one of the first. I'd pull out The Joint Commission standards and kind of use that as a foundation."

Respondent 5, Facility 3:

"A tornado keeps you awake at night because they have about four minutes' warning... I have been through what's called CBRNE training up in Maryland. It's chemical, biological, radiological, nuclear, and explosive disasters...even if you study, or you study at all, bioterrorism, it is a terrifying thing. Cause you're already in big trouble before you even know that you are in trouble. Those are scary. There's a railroad track right down here. There's more anhydrous ammonia than you could shake a stick at that runs up and down this railroad track every single day...We have drilled extensively on that, but those are things...the instantaneous things are the ones that are the scariest. We'd be fine...we'd do okay, but it's the things that you don't anticipate...that leave you the most exposed. So you spend time trying to think of those things and what you would do."

Respondent 7, Healthcare Association Executive:

"So many people get caught up in all of the planning that they lose track of reality. Most of these folks have never had to deal with real disaster out there. Most of the so-called experts in there have never had to deal with real disaster. You know, that's all tabletop to them."

And so you've got all these academic types that that's what's being published and that's what's out there and that's the modeling that's there. There are all these high-end folks that just thought a whole lot of themselves in the room. And all this planning they had done, not a single one had had to evacuate a hospital...it's good to be a good planner, but you also have to be flexible when the caca hits the fan you've gotta be ready to alter your plan...you know, things are not going to go exactly according to the way you thought they were. You've got to be able to have a grip on reality to know how you're going to change your plan for the particular scenario that you are faced with."

Respondent 11, Corporate Healthcare Executive:

"It's [training] kind of one of those necessary evils, you know. I think they work to make you better prepared. Do they guarantee you any type of...no. We didn't think of so many things. I promise you, we never thought at XXXX until we were in that building and knew that we had to be air evacuated. We had never thought of turning the top of our garage into a helipad. We never thought of getting hacksaws to cut light poles down to where Chinook helicopters could land on it. Why would we have thought of that? We were never going to be in that situation, you know, there are things you just don't think of...who would have thought they would've been using the backs of pickup trucks to bring patients from the parking garage up to the top of the garage to the helipad to get them transported out?...a pickup truck as a transport vehicle? We had them available in the garage. It was too difficult going up and down stairs ...some patients couldn't be transported up and down flights of stairs...power was out, you know. You improvise."

Respondent 12, Facility 9:

"We just did a very rigorous risk analysis for XXXX. It was no surprise that one of our

major risks is hurricanes...We didn't say hurricanes, but we talked about extreme wind events and flooding and then, of course, we have others because we're not just doing hurricane planning, we're doing all-hazards planning. For example, another one would be, of course, disease outbreaks. In terms of collaboration for preparedness, we participate in the state hurricane evacuation exercise. They typically will have a rehearsal concept and an exercise or rehearsal of concept. Up until this point, we have always participated in that. I'm in the process right now of talking with Texas Engineering Extension Service (TEEX) to help us do what would be eventually our Joint Commission exercise for the first part of 2011. We are going to break that up kind of into a series of trainings and smaller exercises and kind of culminate that on a big exercise..."

Respondent 13, Facility 9:

"I think we've been trained but,...I think to be proficient in the incident command system you have to use it with some regularity to make it sort of second nature to what you do. So have we been trained? Yes. Do we implement it by the letter of the law? I don't think we do, but there's enough organized around it that it provides a sort of structure that works for us. Now, I know there are incident command purists in the fire service where incident command started that, that's the way they live their lives. We don't necessarily do that, but I think it provides us enough of a structure to be able to make the personnel inside pretty lean, and then to sort of cover all of our bases, based on the different categories that incident command recommends.

I don't have a quantification of the amount of time that we spend on preparation activities. I would say it was probably more after 9/11 than it was before 9/11. And it was definitely more after Rita than it was before Rita, and now, it's more after Ike than it was before

Ike. I think probably more than the time, it's [training] with more intention or with more people's attention to the detail about 'What's my role if something happens here?' I think that's what we've tried to focus on is what, what is the individual's role? Where do I go? Who do I talk to? What am I supposed to do if something happens? And that's...the valuable thing for individuals in their response. What are they supposed to do if there's nobody to give them direction? Where do they go? What's their information source? Then you have to do it both for your personal life and your work life. I think that with the aftermath here in people's personal lives they give a little more attention to how they handle things at home and what they would do in the case of another disaster at home after they've taken care of their work responsibilities.

Have we trained our staff well enough that if nobody else is around, like in the middle of the night or on the weekend that if something came up, that they would handle it the way they should? When all the people who have those responsibilities aren't around, could they handle it the way it should be handled? I don't know if you can ever have enough training or enough practicing—so that's the biggest thing that I think sticks out in my mind when I try to go to sleep at night and think about disasters”.

Respondent 14, Facility 9:

“...the other thing that served us very well during this recovery period is that we had drilled a lot...we know we're at risk for hurricanes. We went through our emergency plans frequently before the storm. Everybody was well versed in the plans and how they function. One of the things somebody taught me a long time ago about emergency situations. Number one, you need to drill frequently so everybody knows what's in the plan. Number two, the plans never completely apply. You end up having to make up things because...you can't anticipate everything that can happen, so you have to be able to improvise. The more you drill, the more

people have the capability to be innovative and come up with good solutions to the things that confront them. One of our jokes, if you will, was that, ‘Well, we’re beyond plan A, B, C to plan T and what’s beyond,’ just because this was something we didn’t anticipate. Our people performed incredibly well. I think, again, they were well prepared. We had drilled a lot. We had senior teams, a group of senior people who were kind of used to dealing with the thought of storms and the damage that they bring, so that served us very, very, very well.”

- **Meaning Unit # 15: How do you evaluate success or make changes in your plans post-emergency?**

Respondent 1, Facility 1:

“We do after-action on three different levels that I know of. We’ll do it on the executive team level, where we’ll have an after-action plan...that’s a report out...everything rolled up from department heads...What went well, what went bad? And then we put together a report and the executive team looks at it...submits it then to the Safety Committee. Safety Committee reviews it. ‘Yeah, we could do this better, or not.’ Then...finally there’s a parish after-action plan. So then we’ll get together as a Region and discuss what went well, what didn’t go well...”

Respondent 2, Facility 1:

“Our experience with Katrina and Gustav and so on, Rita...you know, our staff...our people, who are so critical to anything, but here this is now, you know, a very difficult situation, they performed superbly and they worked extremely well with physicians and we delivered care seamlessly and we did it without relying on the government or others to help us. I think that fits our philosophy, our culture. We try to stand on our own feet. We don’t expect somebody to come in and save us. We are resourceful...we work together in teams. I know that sounds simple...teams...but people don’t always work together as teams and...so you don’t get very good results. Communication’s been great. The spirit of service...volunteers, well even for

people who work here has been incredible. And, like in the last go around, we were the only hospital open in the entire region. It's a hard swallow to keep your hospital open and make the commitment but we did it. And, you know, it resulted in people who have needs for dialysis, for example, there was no other place to go but here. Heart patients who have heart attacks came here during those storms and likely...could have very likely died or had really bad effects of those heart attacks. They received, though...they received the care. So, I don't know if we're totally unique, but I think...we've learned to function well during these...you have to have a clear command center, a chain of command, and you have to know that the information you're receiving is accurate, timely...and you have to make good solid decisions. And then people have to execute those decisions. The last thing, you have to be flexible...you have to be willing to change without much notice."

Respondent 12, Facility 9:

"...we ran a system-wide exercise, the concept being that if your system...is so geographically spread, you're somewhat mitigating the risk if you think of a system and the elements of that system can support those that might be damaged in some kind of a disaster. So, what we have is a mutual aid agreement among the institutions in XXXX, and to exercise it that year in 2007, we decided on a hurricane scenario for the exercise. We ran it in December, even though that's not hurricane season, it was in preparation for the next season. It was called, 'Hurricane Mike,' and was originally designed...this is the XXXX and this is the XXXX and it's coming straight across to XXXX where we have an institution and XXXX, and there's a high pressure system over XXXX, which moved to the northeast, which caused the storm to turn due north with 24 hours' notice. In the scenario, it hit 20 miles east of campus as a category two storm at 2:00 in the morning, which was pretty close to what actually happened in

[Hurricane] Ike. So, the point here being was to drive home the fact that you don't necessarily always have a great deal of warning for a hurricane, because a lot of people have that misconception. In addition, the idea that we needed to build on our system to make sure that we have the continuity for our three major missions...academics, healthcare, and research. In our scenario, we built in that, you know, various buildings had been destroyed here or were unusable...and we had 400 students that were going to be displaced that we needed to find other places...to put them in, so that they could finish out the semester.

One of them clearly was familiarity with the incident command system [ICS] and we've had subsequently two [classes]...the state's...regional liaison officer...came in and taught an ICS-400 level training class where we had about 40 people that were certified...and they gave an ICS-300 level class that we had probably about 20 people..."

- **Meaning Unit # 16: Miscellaneous Information Provided by Respondents**

Respondent 3, Facility 2:

"And so we just really helped to keep people focused. Our board of directors didn't meet for the first week or so, but they all showed up. We've got seven people on the board...six of them lost their homes. And yet they all showed up here at the hospital within a day or two afterwards and basically signed the back of a piece of paper that I found. And we wrote on there, 'This provides the administration emergency spending authority,' and they all voted on it, you know, by signing it, which I used because I not only had that, but when, a couple of days after the storm, the contractors started coming in. The recovery contractors start coming in and offer to help you start cleaning the place out and count your equipment. They have some extraordinarily talented people that follow storms around the country...disasters around the country. Fortunately for us, there were three different companies that showed up. And we

walked them around the building and in reality, on the back of a napkin for one of them, they gave us bids because the first words out of the FEMA people's mouths when they walked in and saw that we were starting to tear out the carpet and get rid of the walls and stuff and they realized that it wasn't all our own people, they said 'Well, how did you bid this? Did you advertise in the local paper?' and I said, 'Well, no, we didn't advertise in the local paper. I didn't realize you had to do all that stuff.' They said, 'Well, all you had to do was access our website; you would've seen it all. It was all right there.' I just looked at the guy and said, 'Well, you haven't been here very long, have you? Have you tried to make a cell phone call? Have you tried to get on the Internet anywhere?' And they just kind of backed off after that. But, fortunately, we had bid out because I had three bids...And they accepted that once I showed them we had the emergency spending authority from the board. So, just another great example.

You know, we saw when the storm hit here, we usually see about 2,000 patients a month in the ER. We saw over 800 patients in the space of 48 hours. So often times, people say, 'Well, why in the heck did you stay?' Of course, number one...we didn't think it was going to be that bad, but number two...if we weren't [here], 800 people wouldn't have had any place to go...in terms of first response, what you run into with FEMA on the Stafford Act, we had food that we fed to police, firemen, hospital workers, community. . .basically anybody that walked in for the first three or four months after the storm. Since we had staff that stayed here, and kitchen staff that stayed here, we were able to find some propane grills and our food...deliveries started backup. FEMA has denied payment for all that, telling us that that's part of our routine operating costs and it's not eligible...and even if it were eligible, they would only pay overtime, they couldn't pay regular pay. However, they would cover it if it were all catered instead of furnished by our in-house personnel. Because then it would be not a regular thing, but catered

...six months or so after the storm we were pretty busy just kind of getting the place back together. Then we started planning how to really reconstruct it. So the time frame was...the storm was August 29th ...we worked out of tents in the parking lot that DMAT brought in and the Air National Guard brought a field hospital down here. And then we...as the main agency, helped coordinate emergency function aid. We were making sure that the clinics that were forming in the community were supervised and the Department of Health knew where they were and that was a whole separate discussion. By October 5th, we had rebuilt the emergency room temporarily with sheetrock and everything and gotten equipment back in order and we reopened the ER on October 5th. And by October 28th, we reopened 25 hospital beds upstairs, which meant we had to create a safe corridor all the way through the building since the ER is on one end and the patient beds are on the other. We had to build all the way through. We did our first surgeries here in December in our reconstructed ORs and we delivered our first baby in January, the next year. So, we were pretty quick putting things back together. But remember, all of this is temporary reconstruction just because we actually had contacts from Washington saying 'Go. Work hard. Get it put it back together because you've got an awful lot of resources down there [the DMAT, the Air National Guard people] and we need them somewhere else. So, they were trying to pull them to New Orleans. As we responded to that, we started working with the architect and, in a mitigation sense, we thought, well, let's take those really high dollar loss areas [operating room, laboratory, emergency department], you know, places with lots of X-ray...lots and lots of expensive equipment. The government was spending...it was about \$25[million], \$26 million of damages to this building plus another \$15 million in equipment...plus another \$5 or 6 million in our other facilities when you add up all the project worksheets. If you just look at the high loss areas here on the main campus, we thought, well, let's build right next to the main

structure. Let's build an elevated structure and let's put the OR and the emergency room and X-ray and some of those high dollar things in that elevated structure as a mitigation effort. So, we worked very closely with FEMA. They came to our meetings with the architects...they sat in on the design meetings and we had this building not completely designed, but it was close enough that they were going to do the detailed construction drawings; we spent \$250,000 in architect's fees. And we got to that point and FEMA changed personnel again. The new team came in, looked at it for about a month...met with us once, looked at it for about a month and then said, 'Can't do it.' You can elevate equipment, but you can't elevate the other spaces. So, for example, in this case, the other example they used for me, because normally, when you elevate things, you're talking about sticking a generator up in the air so the generator doesn't go under water. So, what we were discussing was putting an MRI or a CT scanner up in the air so it doesn't go under water. Well, they said that's fine, you just can't mitigate all the other space around it. So in other words, you couldn't have lobbies, hallways, or patient access to the equipment elevated. You could only have the equipment elevated. So we had visions of...one of our guys drew up a little cartoon of a patient climbing up a rope ladder up to get to an MRI... And we thought that's probably not what we want to do...it took about a year and a half to get resolved and everything. So, then we started from scratch and it took us another couple of years to get through the process of approvals for what we now have out to bid.

Most people don't appreciate just how complicated it is...to design a hospital, you know? And with all the agencies with their fingers in it, the Public Health Service...You're doing it with FEMA. Our review process was just ridiculous...we tried not to make it antagonistic...but rules got so bad."

Respondent 4, Facility 2:

“Well, it’s an unbelievable process. It is truly unbelievable. The project worksheets with all kinds of nuts and bolts, establish, for this building, establish what they call a project worksheet. And then right after the storm they sent people in and they started evaluating the damage. Great idea! Except for we were busy trying to get this place back up and going. So, you know, we had National Guard out here, we’ve got DMAT out here costing God only knows how much and they want to know how long it’s going to take you to get your ER up and going cause they wanted to go home. So, our focus was trying to get our services back up and running. Well, in the meantime...here come the FEMA guys...no healthcare experience...they come in and they write this stuff up...So, they write up the project worksheet and you look at it and you go, ‘Okay, it looks okay,’ and you find out after the fact that they missed a bunch of stuff. And I mean it was just a battle, an absolute battle. You know the building was built in 1985. Well ...there’s life safety codes that have...transpired since that time and FEMA will not recognize that, so they don’t care. So it’s like, by law we have some areas in the building that are not sprinkled, you know, they don’t have the fire sprinkler system in it. Well, by law, if I tear it out, it’s okay as long as you don’t fool with it. As soon as you open it up to do some renovations, you have to bring it up to code. Well, renovating the entire first floor of the facility is a renovation and we have an 1985 construction, a 1994 construction and a 1998 construction. So we have three different levels...about the time you would just get working well with one team, they leave...And somebody else comes in. And they start out, ‘Well, you got copies of this?’ Same questions. ‘You got copies of this?’ ‘Hell no, I don’t have copies. The stuff I had was flooded and the stuff I got we...already gave the other guy.’ ‘We can’t find them.’ The first plan they told us, ‘Well, the best way to mitigate this is to build another facility and just tie it

into this building and put all your expensive stuff up.’ Great idea! It would have been easy. We spent a year and a half working on that and then they came and pulled the rug out from underneath and said, ‘No, you can’t do that.’ I was like, ‘What?’ So I mean unbelievable, just colossal waste of time. We spent, I think, about \$160,000-\$170,000 on A&E fees and testing and things like that and they didn’t want to pay it...they finally did, but not without a struggle ...we asked for a letter...we wasted a year and a half of our time and we want[ed] something in writing. That took probably two or three months to get and when it came, if you would have read it you would have thought, ‘God, the hospital people are really stupid.’ I mean, it flat said that we didn’t follow the rules. And I was like, ‘Whoa, time out here!’ So you know, they went back and massaged it. They weren’t about to take the full blame for it, though. So that’s been a lot of the frustration.”

Respondent 7, Healthcare Association Executive:

“FEMA came out with money, \$30 million dollars, post-Gustav for a generator grant program. HVAC Mitigation Grant is what it’s called. And basically because of the issues that we had with air-conditioning and the lack of after Gustav, this grant money came out to help hospitals...harden their facilities to include and give them more air-conditioning capabilities during the course of the storm. So, there’s grant money. Politics gets into play with a lot of this. Nursing homes could get the bulk of the money. Hospitals get about \$8 million dollars of this \$30 million dollars, to go across. Now a generator set...that will power...entire facility, lock, stock, and barrel, air-conditioning, everything is millions of dollars. And so, it wasn’t money that was going to actually pay for them [to get] a generator to do all of that, but it was a little bit of money to help...anything helps. That was a year and a half ago...there’s been maybe six hospitals that have gotten money out of that program so far...it’s just the bureaucracy of it all

that comes down and it's just amazing...that FEMA will come up with this rule or that rule or this rule or that rule...and hoops to jump through for hospitals to try to get this money. And oh, by the way, we forgot, there's this rule now, there's this rule now. So that changes gears and slows things down and so here we are a year..."

Respondent 8, Facility 4:

"I think some of the other big issues that we faced and some of the gaps were pets. We had about 130 to 150, can't remember exactly the number of pets in the facility. So many facilities in the city now will not allow pets in there. There is federal legislation on the pet act that has to be followed through. There are places now for pets to go in times of those things. That was one issue."

"I think that...probably, after communication, probably number two on the list [is security]. I never personally felt unsafe because I knew the place. I've been there 30-something years. Many of us had been there that long, so we pretty much knew every inch of that place. I think it was pretty unsafe if you want to look at it. I want to say there's about 20 plus ways to get into that facility, maybe even more than that. So again, trying to man those, lock those down, you know, the garage was all open, which goes into the hospital. Going into that, we did have people, we had several, there was a stabbing victim that came in during that time we took in. During the day, there were policemen that came to the hospital and stayed on the ER ramp, typically with us, with guns. There were several occasions where people did try to get in the building that we turned away. They were just neighborhood, who knows where they came from. There were people across the street in our XXXX building...right across the street. They had broken in there and kind of took up refuge and [were] kind of hanging out, barbequing,

screaming at the nurses across the street, when were we gonna get out of there so they could get in there, and things like that. I remember the last night, that Thursday night, there were about 30 of us left because everybody else had been evacuated and because it was night then and we couldn't leave. We all stayed up on the heliport and we did have some security guards.

However, most of them were not in good shape to do anything, but people did bring guns in there. They were armed, so some of the guys did take turns standing and watching us as we were on the roof. The one thing that really hit home to me about how unsafe it was...it was early that Friday morning and we were waiting for someone to come get us. There were about 30 of us left. On the intensive care unit on the eighth floor, you can get out on the roof from there. That morning, I heard one of the guys that was with us saying, 'Get back or I'm going to use this gun,' kind of thing, I don't know the exact words. They actually had people coming out of the hospital. We had evacuated everybody, I personally had mostly gone through that building, and most of us had gone through and made sure everybody was out. However, people were still getting into that building...I don't know where they were so and then that night also as we sat there we could hear car alarms going off underneath us, was of course one of the garages, and glass being broken, like people trying to get into the cars, so they were there on the periphery."

Respondent 9, Facilities 5 and 6:

"We lock the building down...We do have armed post-certified security. Well it's really a legal police department. And most of them carry, you know, are armed with a pistol and during a storm will actually break out assault rifles that they are armed with in case somebody tries, like during Katrina when they were trying to storm hospitals either to get in to seek shelter or either to get in thinking they could get in and can get drugs...or whatever their situation was. So we lock the building down and, you know, on this campus...we didn't have any trouble on

the XXXX campus. They had some problems on this campus during Katrina with outsiders. At XXXX campus, we did not. Why, I don't know, because XXXX campus was more accessible. You had to swim to get to this one. You could wade to get to XXXX. The water depth out here was like six, seven feet in the street, whereas at XXXX it was like about two feet."

Respondent 10, Facilities 7 and 8:

"We have very good security. That was a very real issue here. We use...armed officers with full arrest authority. We had an arsenal here with bigger guns and stuff if they needed, what have you...they brought them out during Katrina. While there were concerns about various areas being unsafe, nothing really happened to anybody or anything inside this place. We were okay from that standpoint. If you have a place that doesn't have it, the XXXX, we didn't have much of a police force there and they didn't have as many folks as we did. One of the first things we brought down was police officers. The first thing in was police officers with supplies, with extra weapons and we used the vehicles that brought them in to start the evacuations. Security is a big piece of it, but we had it here. It was fine here. We were like a small-armed camp in that sense and we were prepared to do that again during Gustav...We have a lot of real estate down here to protect.

XXXX had an electronic health record...and it was...decentralized to each hospital but you could talk to other hospitals. So if you saw a patient from Houston, say in New Orleans the thing would show up and say that that patient had records in Houston. Then you click on it and you can go open those records and pull them in to your New Orleans records. It was really...a Houston chart, a New Orleans chart. They're working to make it all one unified, centralized chart now, but at that time they were decentralized but they could talk to each other. When the Sprint lines went down, you could no longer talk to New Orleans and all these people were

evacuating New Orleans...including XXXX patients. We have basically a data warehouse in XXXX where monthly we pull data extracts of other hospitals, a whole bunch of stuff... administrative work, clinical data we put in a relational database we do all kinds of analysis with. But, it had every patient's name, the major diagnoses, their medications, things like that. We set that up on a secure website where people could access within a day to pull up any of that patient information, so if a patient showed up in your emergency room from XXXX, you can get that information. I say that because Newt Gingrich gives a talk cause he's a big fan of electronic health records. He said there were patients from XXXX showing up in Texas with cancer, and they not only did not know what they were being treated with, they didn't even know what type of cancer they had. When you're in the middle of chemotherapy/radiation therapy, that's impossible to manage if you didn't know. You just can't start over again. You will kill them with the treatment if you don't do it right...very difficult...we got tapes out, backup tapes, flew them to Houston and set up a virtual New Orleans, so whenever you went someplace that New Orleans icon appeared again and you could go get all the New Orleans records...And all those patients, their medical records followed them anywhere they wanted to go in the country...So, I am a big fan of electronic health records...they're trying to do with some of the money in the stimulus bill. The other piece I would point out for special populations, patients who have special diseases, or special conditions, transplant patients, dialysis patients, patients in the middle of chemotherapy, patients with very funny diseases in the middle of very unusual treatments. You need to have agreements with those patients beforehand, where they're going, who they're gonna contact, where they're gonna stay, contact information there, alternative sites, a number they can contact you for information, what have you. You just can't go someplace in a random evacuation if your kidneys aren't working. You have to be able to get plugged in to a dialysis

center in a few days or you're gonna be one hurting puppy, or if you need to start your cancer chemotherapy, or something up. So, special risk populations...you need to have special evacuation plans for them, even if you expect them to evacuate on their own...you need to have a way to make sure their care is resumed elsewhere without a dangerous interruption. Also, you must have a way to rally them back together when they come back...and contact you...You give them websites to go to, all sorts of things. I might add, the Internet was a great way to communicate with all these folks who are spread all over the place...same thing with your employees. You should know where they're evacuating to. They should have a common call point, a website, things like that. For example, during Gustav, we communicated to everybody over the web...here's how we're gonna find out announcements, where we are, what we're doing..."

Respondent 11, Corporate Healthcare Executive:

"I had to reproduce and research every text message, every e-mail, every piece of handwritten document because it's all contingent upon your reimbursement, it's all contingent upon validating what did or didn't happen, and justifying this interruption coverage to your own insurance provider. Also, much less through what the feds were gonna reimburse you for, the state was gonna reimburse you for. And granted, we never used, you know, even with Gustav, the state's evacuation resources, we used our own. We paid for our own, so basically, our reimbursement was a little bit different from the other non-for-profit facilities' reimbursement in that we were looking for validation of reimbursement from our insurance companies, for business interruption, more so than the federal component. . .we have again, our own insurance department at corporate that handles all that and they are used to handling it because when you have...hospitals across the country...you're gonna have disasters...in one way, shape, or

form. It may be a different type of disaster but it's still relatively the same process from the same point of validation...collection, reimbursement..."

Respondent 12, Facility 9:

"...we had developed some system-wide contracts with disaster response contractors. I was in contact with them, too, because what they do is they stage what they think may be necessary for the response. So they're basically repositioning trucks, you know. With Ike, it was, you know, moving it up the coast to XXXX and finally up here just outside of the XXXX area. So one of the things that happened shortly after the landfall, you know, they couldn't get in because the XXXX was blocked and also, too, there were roadblocks in the area even for when the road was clear. So I got a call from the disaster response contractors saying that they couldn't get through the roadblock and so I called up the state operations center. They were able to call on the State Troopers' cell phone to tell them to let this convoy—we had about twelve semi-tractor trailers loaded with water pumping equipment, generators, fuel, drinking water, food, you know, that sort of thing. So they let them through. They ended up doing about a hundred million dollars worth of work, okay. I can't speak too much to the insurance, but, basically XXXX is self-insured, but they do have a catastrophic insurance that they get and I think that they got it. They put it in place, cause you can imagine it is hard to find insurance for this area, you know...for the value of the assets and the vulnerability and they had just put in a catastrophic policy, like that year.

In terms of what are some of the things that went right, of course, the disaster response contractors, I think, having them available was a very good outcome. It helped to mitigate a lot of the damage in that they were able to come in and mop out, dry the equipment out, rip out sheetrock, etc. There was a key lesson learned there, and that is many universities and medical

schools and so forth aren't used to dealing with very large claims to FEMA, and dealing with contractors who are holding out as experts in the field. So, at the time, XXXX really didn't have the expertise in documenting a disaster and hence it became a little bit difficult in the claims process with FEMA. So one of the things we're kind of taking from that now is working with the contractors to qualify them. In other words, to make sure that they understand what the FEMA process is and not just asking them, you know, 'Do you know what it is?' but making sure that they really do. Then, one thing that we're going to do or trying to put in place now is to basically write our business rules with each of the candidate contractors. There are sort of contingency contracts in place...so it's a question of who you would bring in. It might be scenario dependent, you know, whether it's more of a HAZMAT incident, or if it's mostly, you know, a flooding incident or whatever. Basically, in the incident command, there is a research request document, a 213, that's used and the contractors would understand that unless you have a signed 213, you're basically volunteering to do the work because you won't be paid by us. That's good incentive for them to make sure that they've got the appropriate documentation for all the work that they do, which then implies that, you know, there was an incident action plan approved by the incident commander, so these are the objectives and then these are the tasks that flow from that. So six months or a year later when FEMA comes by and says, 'Oh, why did you do this, or when did you decide to do this?' We simply go to the 213 number, go back and you've got the documentation that you need. That was kind of a key lesson learned and probably something that a lot of...institutions really are not familiar with and could get burned."

Respondent 14, Facility 9:

"...we have several things in our favor. Number one, we're a system. We belong to a

system...of institutions...it's so large with fifteen different components used to working with FEMA.

You know, things happen in our institutions...The people in hazard mitigation and risk Management...are pretty well aware of the FEMA issues...had dealt with them, are still dealing with some of those...the system also has been very willing to bring in consultants and we did that early after this [Ike]. We brought in that James Lee Witt firm. Of course he's a former director...of FEMA. We have some personnel who had been engaged here with a small FEMA recovery effort and we hired a few, not purposely for this reason, but we had hired a few from XXXX who had been through the experience with them. It certainly was helpful to have them on board. In fact, one of those people in finance, one of the more senior managers is leading our effort to work with FEMA, James Lee Witt and The Office of Risk Management for XXXX. I certainly can't argue with the advice that others have given you. It is very helpful to be well versed in the FEMA process...to have experience with them, because we had the same sorts of situations where FEMA teams change and the assessment changes. It's very frustrating.

...there were many discussions occurring in Austin among leadership in XXXX, among the governor, lieutenant governor and staff members, the members of the legislature...storm prone for \$150 million dollars which is what it's probably going to take, at least that's rebuilding ...moving lock, stock and barrel to XXXX. . .and put the medical school where we want in association with XXXX. It was a huge uphill battle and everybody here knew it. We weren't really sure if we were going to be in existence or not until the conclusion of the 2009 legislative session. So we had a lot of educating to do and we went at it with passion. I think what was most effective for us is the return on investment argument. First of all, to replace this complex anywhere, replacement cost of all these buildings is probably somewhere between \$5 and \$7

billion dollars, and that may be conservative. To rebuild a complex like this would probably take 10 years particularly when you consider recruiting faculty and the like...So we're producing 800 health profession students every year who are going out into the workforce...bringing in \$150 plus million dollars in research funding from external sources every year. We're responsible for 30,000 jobs across the state of Texas, at \$1.5 billion dollars per year economic business volume impact on the state. When you start trying to move us that all goes away and you don't recover it for at least 10 years and...we are number one in the country in terms of educating under-represented minorities. The kids tend to go back to the cities and towns where they came from in Texas, which is where the need is greatest, with the best record of any school...in Texas. Our kids score highest on their national board exams of all the medical schools in Texas. So, are you really gonna let that go and run the risk of not restoring it when you can spend that \$100 to \$150 million and get the FEMA match and rebuild it historically for the future? And that argument over a course of time did...hold up...we made it and we're doing well, and I think we have a marvelous opportunity to truly storm-proof this place and never again have this sort of damage. What the architects and the engineers have told me, when we finish all of the mitigation work and all the repairs and move everything up that a storm the magnitude of Ike or greater, level five, 160 mile an hour winds and 30 foot storm surge...maximum damage in 2008 dollars is \$50 million. It's still a lot of money, but it's an insurable loss for an institution this size. And that's basically what our insurance coverage was, was...\$50 to a \$100 million dollars. Our total loss was closer to \$900 million and you add \$100 million in mitigation on top of that, we're talking about one billion dollars of investment. But again, if you think about the return on investment, what we do for the state, the business volume impact on the state, the jobs and the like...actually the billion again generates a return in the next three to four years. So we think the

economic argument...is strong.”

Themes

The peer debriefer reviewed the meaning units clustered by the researcher. Through reflective meditation and imaginative variation, they came to agreement on the themes (invariant horizons) of the respondents’ experiences that had become apparent during intensive study of the transcripts. The researcher validated the meaning units and their accompanying theme against the complete record of the transcripts, checking each meaning unit to determine if it could be categorized into one of the themes while being expressed or by being compatible with the theme. In other words, the themes were supported by the meaning units (Hathorne, 2006). According to Moustakas (1994), these themes represented the core elements of the respondents’ experiences.

Table 2.: Themes and descriptions of the lived experiences of the hospital respondents during and after Hurricanes Katrina, Rita, Gustav and Ike, in 2005 and 2008, respectively.

<u>Themes</u>	<u>Descriptions</u>
Polymakers/Planners	Perceptions of readiness post-storm; critical experiences, lessons learned; major changes, innovations adopted; identification of special needs (dialysis, oxygen, etc.)
Plans, Policies and Procedures	Post-storm impact on future plans, policies and procedures; memoranda of understanding, funding and grants; evacuation, shelter-in-place decisions
Capital Investment	Communication devices; physical plant improvements and modifications; other protective equipment and supplies; effects of economy, funding opportunities; reimbursement issues
Human Resources	Additional staff; reassignment of job duties; policies as they relate to reporting of essential staff; experience of staff; organizational culture; security
Training and Drills	Frequency of training; manual updates and changes
Evaluation of Success	Nature and extent of changes in preparedness; quality of response to the emergency; adequacy of readiness for future emergencies

Composite Thematic Textural-Structural Description

The researcher reviewed each transcript once again to capture the meaning and essence of the individual respondent’s experience by incorporating the meaning units into identified themes.

Thematic Textural-Structural Composite

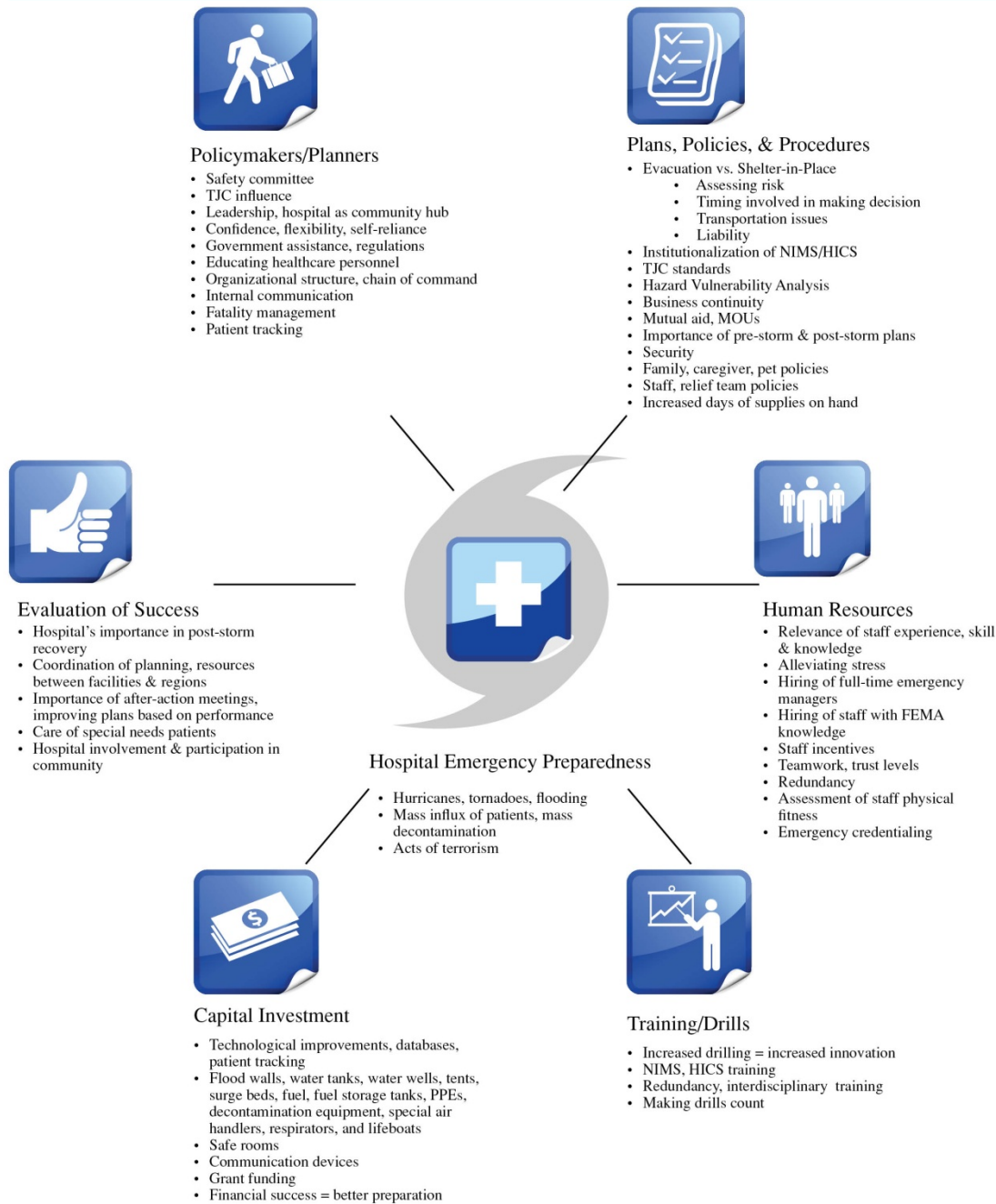


Figure 3: Thematic Textural-Structural Composite.

The initial step was to construct textural and structural descriptions, followed by phenomenological reflection, imaginative variation and analysis of the textural and structural

elements of the experience. Through reanalyzing the data, the researcher was able to summarize a composite thematic textural-structural description based on the experiences of each respondent (Hathorne, 2006). The remainder of this chapter is devoted to the composite thematic textural-structural description.

Hospital Emergency Preparedness

Overall, hospital emergency planning is “all-hazards,” focusing on weather events and flooding, mass influx of patients (e.g., pandemic flu cases, use of biological agents, casualties related to terrorist attacks and incendiary events) and mass decontamination of patients.

Respondents involved in this study, due to their close proximity to the coast, were particularly concerned with preparation for hurricanes and tornadoes.

Policymakers and Planners

Hospitals participating in this study have a Safety Committee charged with emergency preparedness duties. The committees meet between six and 12 times a year to discuss matters relevant to improving response to potential disaster scenarios. The Safety Committees must ensure that numerous and specific elements are included in their planning as mandated by The Joint Commission (TJC), their national accrediting body. Safety Committees plan and execute the drills, lead after-action planning, implement policy changes, and make recommendations to the hospital administration and/or board for the purchase of equipment and facility improvements that will make their organization’s ability to respond better and their physical plant more impervious to Mother Nature.

While some respondents felt that the storms of 2005 did not change the way their organization reacts or plans, most respondents felt that hospitals collectively are better prepared as a result of their experiences. One obvious improvement would be just that—the “lived

experience” gained through preparing for and managing through the hurricanes—whether it was Katrina, Rita, Gustav or Ike. With each successive strike, the hospitals felt their capacity to handle their operations was enhanced. With multiple storm experiences under their belts, staff members and leadership have a greater confidence level. One respondent remarked that he felt his facility was more confident about meeting disaster and crisis head-on, but certainly was not arrogant about it. This same respondent, whose sentiments were echoed by several others, also commented that hospitals must be realistic, flexible, improvisational, and self-reliant. The healthcare market can be difficult to navigate with its complex regulations and reimbursement schedules that become more so under the duress of crisis. Therefore, realism and flexibility are important traits to keep in mind when planning and managing in crisis circumstances. That flexibility, creativity and ability to improvise cannot be underestimated. These characteristics are critical in an emergency when you need to alter plans, policies and procedures due to the unique conditions of the situation at hand. Being self-reliant was another quality that respondents mentioned frequently during the interviews. As they learned during the Katrina experience, help does not always arrive when promised. Therefore, facilities need to be able to stand alone for longer periods than previously planned.

To be eligible for accreditation by The Joint Commission, all hospitals are now required to operate under the auspices of the National Incident Management System (NIMS) and/or Hospital Incident Command System (HICS). This provides a consistent emergency operating structure with a specific chain of command, allowing the hospital to communicate with external agencies and Emergency Operations Centers (EOCs) with universally understood terminology. Respondents explained that compliance with NIMS and HICS is required to be eligible for

reimbursement by the Federal Emergency Management Agency (FEMA) and to obtain other available government-sponsored grant funds.

Training and drills are important to allow staff to have the opportunity to work through their plans and make suggestions for adjustments in addition to enabling them to clearly understand and/or question their particular roles in a disaster. As well, the provision of regular internal communication was pointed out as a critical need for staff and patients during a crisis event. You must keep these audiences informed with accurate information to reduce the rumor mill so that staff can continue to give high quality care.

The significance of training not only within the facility, but within the community and beyond, even regionally, was discussed. Respondents consistently touted the value of being strong community partners and having personal relationships within their communities during good times and especially during a crisis. Knowing law enforcement, political, and community leaders carries great weight in managing through a disaster. Also important were relationships with vendors and suppliers and taking time to strengthen those bonds as well as to contract redundantly in the event one supplier or vendor is not able to provide goods and services as hoped.

Respondents also spoke of several other essential areas that need consideration in future disaster planning. Dealing with FEMA has become particularly onerous for most institutions, particularly those that have been subject to damage. Respondents spoke of the need for facilities to become well-versed in FEMA rules and regulations, to the point of hiring such expertise within their organizations. Another suggestion was to initiate relationships with recovery contractors in advance who are equally familiar with FEMA regulations, so that when the time comes, your facility is prepared to move quickly to restore operations. Patient tracking and

development of electronic medical records also was mentioned as a policy area that needs governmental attention in the future. Triage—applying battlefield techniques to provide help, equipment and resources to those most apt to survive—and fatality management are other topics that should be debated and agreed upon.

Finally, higher numbers of physicians, nurses and allied health professionals need in-depth training in emergency preparedness and operations. They need to understand the unusual and often harsh realities that come with managing a disaster of huge proportion, e.g., the storms of 2005 or the tornadoes of spring 2011. The American Medical Association (AMA) and others have made training available to healthcare professionals.

Plans, Policies and Procedures

Major changes in plans, policies and procedures have ensued since Hurricane Katrina. Primary among those has been the elevation of the discussion related to the shelter-in-place versus evacuation debate. While one respondent claimed a shelter-in-place philosophy no matter the storm conditions or warnings, other respondents have developed plans for sheltering-in-place as well as evacuating. Respondents cited the difficulty in making the decision to evacuate patients and the associated risks with making either decision—to stay or go. The lack of sufficient staff and transportation resources to completely evacuate multiple healthcare facilities when time is of the essence is one problem that often was cited. Other key issues include the benefits of and predicaments associated with initiating contraflow on major highways and interstates. Although it provides faster egress from the hospital facility, it allows no vehicular ingress, therefore requiring a much greater number of transport vehicles. Last, but not least, hospitals must weigh liability issues linked to either staying put or evacuating as well as the financial ramifications caused as a result of the latter course of action. There are legal

ramifications for making either decision in the event of patient injuries or deaths sustained as a result of either course of action.

Louisiana has a new Medical Institution Evacuation Plan (MIEP) post-Katrina that can be used by facilities as a last resort in evacuating patients on C-130 military planes. Texas has its HEAT teams to assist with moving patients from place to place. All respondents are using self-reporting mechanisms to inform state authorities of their status as it relates to census, patient criticality, fuel, water and food stores, generator power, etc. These resources have been taken into account in current hospital plans and procedures, as has institutionalization of NIMS and HICS as previously mentioned.

Hospital emergency planners use a “hazard vulnerability analysis” (HVA) to help in prioritizing the most probable emergency to occur for the particular facility. For example, hospitals located in the Deep South would be less likely to plan for an ice storm as they would for a hurricane. Based on the results of the HVAs, hospitals plan and train accordingly.

Business continuity is another area of concern and pre-planning for hospitals. This is not a new phenomenon, but since Katrina, hospitals are investing more resources in assuring that their patient and business-level data is backed up appropriately and is housed in a safe and accessible location. Hospitals are arranging for alternate, remote sites for their Information Technology and Communications personnel to operate from to ensure continuity of business operations.

Respondents mentioned mutual aid agreements with hospitals in their locales and beyond. In several cases, respondents doubted the ability of nearby facilities to assist them in their time of need, particularly if those facilities were experiencing the same crisis. Memoranda of Understanding (MOUs) is another area respondents are paying more attention to, with facilities

engaging in contractual agreements with multiple suppliers for pharmaceuticals, water, food, linens and other necessities.

At least one coastal respondent did not have adequate plans for storm surge and facility flooding. As a result of Katrina, facilities are planning to be self-sustaining for longer periods of time and investing in increased days of supplies-on-hand that will make them more so in a flooding event.

Whereas most hospital hurricane plans primarily paid attention to pre-storm activities, since Katrina it is obvious that facilities must plan for managing post-storm in their facilities as well. All respondents cited plans and procedures to guide them on reducing their censuses, canceling elective surgeries and procedures and bringing on essential staff as well as planning for a team of staff to relieve.

The need for plans to be flexible is, again, a necessity. There are many unknowns that arise as a result of a crisis or disaster situation, so leadership and staff must be adaptable to the circumstances that present themselves.

Two other important areas to which hospitals have devoted planning resources since the storms of 2005 are (1) security and (2) the number of people sheltering in their facilities. Where security is concerned, many respondents cited the need for having an armed security presence in their facilities during a crisis. Besides helping to maintain a safe environment under severe circumstances, security is helpful with implementing lockdown procedures and assisting with crowd control, if necessary. Hospitals have severely limited the number of family members, caretakers and pets in their facilities since the tribulations caused by Katrina. In most cases, no longer are family members of patients or employees allowed to shelter in the hospital. Pets are also being prohibited. Hospitals have enacted these new plans to greatly reduce the number of

people they must feed, sleep and make secure during a hurricane, as well as decrease the number they must evacuate post-storm, if necessary. However, some facilities are making alternate arrangements for staff family members and pets to ensure that staff are available to return to work more quickly.

Capital Investment (Facility Hardening)

Hospitals have invested extensively in hardening and mitigating their physical plants after the hurricanes of the last five years. Additionally, they have invested in technology, database development and communication devices to improve markedly their response capabilities. For instance, Louisiana's aforementioned At-Risk-Registry (ARR) and EMSTAT were planning databases designed and implemented post-Gustav to assist in monitoring hospitals' well-being at any given point in time, pre- and post-disaster.

Hospitals are constructing floodwalls, installing fuel storage tanks, water towers, tanks and wells. They are also purchasing large-capacity generators to allow themselves to operate at 100%, as well as tents, surge beds, personal protective equipment (PPEs), respirators and commercial decontamination equipment. In addition, they are acquiring lifeboats, building safe rooms and overstocking supplies.

Communication was an enormous problem after Hurricane Katrina, and hospitals have used grant money as well as institutional funds to pay for sophisticated radios, email notification and satellite phone systems.

The economic hardships of the past several years have taken their toll on hospitals' ability to make emergency-related capital investments. Clearly, financial success usually equals better preparation in a healthcare facility. Unfortunately, according to more than one of the research respondents, the economy has increased hospitals' bad debt percentages.

Simultaneously, hospital payor mixes have changed dramatically, in some cases, in hospitals affected by recent storms, due to large groups of evacuating residents not returning. This means hospitals are less able to hire new staff and have less money to invest in preparedness. Exacerbating the situation are reimbursement difficulties created by the slow-moving bureaucracy that is FEMA.

Human Resources

There have been many human resource implications on hospitals since Hurricane Katrina. To begin, several respondents articulated the need for building an environment of trust and teamwork among employees long before a crisis to ensure that operations go as smoothly as possible when one occurs. The level of employees' lived experiences, skill and knowledge during critical times was alluded to several times.

Another trend is that hospitals now, more than ever, have dedicated emergency management professionals in their facilities, especially the larger hospitals. Smaller institutions who may not be able to afford this expense are, nonetheless, spending more time and devoting more resources to training individuals in keeping up with mandated standards and guidelines and instructing others in the organization about relevant emergency topics. Along those lines, some respondents mentioned that they have hired or have on contract individuals with deep knowledge of FEMA regulations and reimbursement rules.

Hospitals have imposed strict guidelines related to working in a crisis. Nearly all respondents mentioned that they have staffing procedures that take into account personnel who report during the storm and those who are responsible for relief. If staff do not report to work for their designated shift, termination is a strong possibility. For those who are storm-riders or relief personnel, one respondent mentioned the need for assessment of staff's physical fitness

according to age and responsibility. When power is out, necessitating numerous trips up and down flights of stairs carrying equipment and patient care items, this can be an issue. Keeping staff occupied consistently to help keep their minds off the potential condition of their homes and worrying about their loved ones was important. Stress, feelings of loss, the importance of rest and the ability to recharge their batteries were also mentioned by several respondents.

In each state where respondents were interviewed, regional coordinator personnel were mentioned. These employees are typically paid for by a collective of regional facilities or the state hospital association. In some cases, the positions are voluntary. In all instances, this individual(s) is critical to maintaining communication between and among hospitals in a given region.

Most all respondents pointed out that they have put in place procedures for credentialing emergency staff. Some facilities, particularly those that are for-profit, have also taken great pains to provide housing options for employee family members and pets to assure greater reliability of the employee when needed.

Providing for redundancy of important management positions and line staff positions during a crisis is extremely important. Respondents have given this considerable thought and planning and allow various staff to exercise different roles during disaster drills to test their skills.

Evaluation of Success

Hurricanes Katrina, Rita, Gustav and Ike have altered the paradigm of how people react to storms. After Hurricane Katrina, in particular, significantly more emphasis and resources have been placed on hospital emergency preparedness. TJC has devoted an entire chapter of its accreditation manual to emergency preparedness, and hospitals must meet more stringent crisis

management requirements to maintain their accredited status. Not only do hospitals have responsibility for caring for their inpatient census during a crisis, but as a place of community help and refuge, they feel a strong sense of responsibility to their communities for treating post-storm injuries and illnesses. As a result, their Emergency Departments often see double, triple and even quadruple the usual number of visits.

After-action meetings were cited most frequently as a way to evaluate a facility's performance during a crisis. Staff come together and discuss things that worked and things that did not go according to plan. Employees and leadership make suggestions and talk about how to improve for the future. Interview respondents commonly referred to the need for increased resources, coordination and planning between facilities and states. This appears to be occurring with more regularity since Katrina.

Another considerable issue that respondents said must be addressed is special needs patients, notably dialysis- and oxygen-dependent patients, mental health patients and others with chronic and rare medical conditions or diseases. For patients requiring dialysis and oxygen, the federal government must intervene and assist states and providers in making these critical services available to these populations.

CHAPTER 5.

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

Summary

Why is studying hospital emergency response so important? Hospitals are places of refuge for their communities. When all else fails, communities depend on their base infrastructure of support—police, fire and health. Hospitals embrace their role in the communities they serve, protecting, preserving and enhancing our quality of life. If hospitals do not respond quickly and appropriately in an emergency, people can and will die.

After the hurricanes of 2005 one thing was clear: hospitals and healthcare providers needed to make significant and necessary change in their level of emergency preparedness for the future. While they have made much progress since 2005, they still have work to do.

During the past 12 months, (five years since Hurricanes Katrina and Rita made landfall), I have spoken to hospital chief executive officers, hospital emergency planners, nurses and others knowledgeable about hospital disaster response. A tremendous amount of good has been accomplished since the storms of 2005, as my study illustrates. Evacuation procedures and patient tracking systems are remarkably better. Planners are working together more cohesively within their local jurisdictions and are looking beyond those boundaries to develop relationships and interact with their regional counterparts. Coordination at the state level for hospitals is much more improved. Staff have perfected internal operating procedures. Hospitals have invested millions of dollars into “hardening” their physical plants, building water tanks and towers, constructing flood walls, installing fuel storage tanks, acquiring bigger and better generators, contracting for supplies, food, pharmaceuticals and transportation assets. They have purchased tents, lifeboats, respirators, decontamination and personal

protective equipment. They have significantly improved their capacity to communicate, obtaining more powerful, hand-held radios, Internet-based communication systems, more versatile telephone systems, satellite voice and data capabilities, as well as recruiting volunteer HAM radio operators. Hospitals are using networks created for their unique, specific needs to track patient movement and assist in deploying supplies and equipment. On the whole, hospitals are investing more time and energy into training and drills, making them count and ensuring redundancy of their operational systems and leadership. Having adopted NIMS, hospital staff say they have a better operational framework and better knowledge of what to do and when to do it. Having experienced Hurricanes Katrina, Rita, Gustav or Ike firsthand, or having observed what happened as a result of these storms, hospitals nationwide are thinking much more seriously and critically about their role in an emergency.

However, more work lies ahead for the nation's hospital community. According to a study done by the Centers for Disease Control (CDC), "Hospital Preparedness for Emergency Response: United States, 2008," "Although nearly all surveyed U.S. hospitals had plans for responding to mass-casualty events such as earthquakes and chemical spills, gaps and omissions were common" (Gever, 2011, ¶ 1).

Richard W. Niska, MD, MPH and Iris M. Shimisu, PhD "analyzed responses to the 2008 National Hospital Ambulatory Medical Care Survey, which included a supplement on emergency response preparedness completed by 294 hospitals. The supplement asked for details on plans for responding to six types of events: epidemic-pandemic disease outbreaks, bioterror attacks, chemical accidents and attacks, nuclear-radiological events, large explosions and fires, and major natural disasters" (Gever, 2011, ¶ 2).

"Only about 68% of hospitals had plans for dealing with all six types of events, the

researchers found. Most often omitted were plans for explosive-incendiary and nuclear-radiological events, each missing in roughly 20% of hospitals. On the other hand, more than 95% of hospitals had plans for natural disasters or chemical incidents. Planning was also often deficient when it came to patient transfer arrangements with other hospitals in cases of large number of casualties” (Gever, 2011, ¶ 4-6).

Perhaps the most important shortcoming, according to Niska and Shimizu, was a low rate of special planning for pediatric patients. About half of hospitals also had not delineated how they would manage special needs populations, such as people with limited mobility, pregnant women, the blind and those with mental health problems or chronic diseases. (Gever, 2011). Some of these concerns were highlighted in Japan in spring of 2011 following the tragic March 11th earthquake and tsunami. Healthcare providers in Japan found that their biggest challenge was not in treating the direct casualties of these events, but rather in maintaining care for individuals with chronic diseases (Gever, 2011). “The large-scale homelessness and disruptions in electric power and transportation meant that patients with diabetes, renal disease, and similar illness lost access to medications and other treatments” (Gever, 2011, ¶ 16).

On the other hand, the CDC report also found that hospitals did well in certain aspects of preparedness, as confirmed through this research. “For example, large majorities of hospitals had included other local agencies such as health and fire departments in their planning; developed regional communications systems to track available beds in their communities; and made plans for continuity of operations or evacuations during emergencies directly affecting the hospitals themselves” (Gever, 2011, ¶ 17-18).

Another study further highlighted improvements made by hospitals. “More than 76

percent of hospitals participating in the National Hospital Preparedness Program (HPP) met 90 percent or more of all program measures for all-hazards preparedness in 2009, according to a report released today by the U.S. Department of Health and Human Services' Assistant Secretary for Preparedness and Response" (U.S. Department of Health & Human Services, 2011, ¶1).

From Hospitals to Healthcare Coalitions: Transforming Health Preparedness and Response in Our Communities,' the program's first state-by-state report, identifies the advances that states have made in preparing hospitals for all types of disasters. The report also discusses the next steps the program will take to boost community resilience (U.S. Department of Health & Human Services, 2011, ¶ 2).

Hospitals meeting preparedness performance measures have dedicated redundant, interoperable systems in place to communicate between hospitals, public health agencies and emergency managers. These hospitals can report the number of available beds to a state, territory or city emergency operations center within 60 minutes of a request during a disaster. These hospitals also have plans to handle a surge in demand for hospital services during a disaster, as well as plans for hospital evacuation, sheltering patients and staff in place during a disaster, and to respond to mass fatalities (U.S. Department of Health & Human Services, 2011, ¶ 4-5).

The report suggests that, as an increasing number of hospitals meet performance measures programs, participants also focus on building coalitions within communities so that hospitals, government agencies, nongovernment organizations, businesses and community residents work as a team to prepare for and respond to disasters. The report recommends that these coalitions involve all populations within communities, including children, pregnant women, the elderly, and those who are vulnerable in other ways" (U.S. Department of Health & Human Services, 2011, ¶ 8).

Amid all of the progress, my research has concluded that there is still more to be done, but not all of it by the hospitals themselves. State and federal governments must continue to act on behalf of healthcare providers to ensure that this industry, critical to catastrophic incident response, has the resources it needs to take action when the time comes. We will have to make bold steps to lift our nation's hospitals' emergency preparedness to the next level.

What will it take? We need to have a sense of urgency and get serious about reforming and reorganizing the roles and responsibilities of government agencies in charge of helping the nation's hospitals in times of emergency. We need to bring together the right people under the right leadership at the national level to institute new guiding policy and streamline decision-making processes so appropriate help gets where it is needed much faster. We need informed, empowered stakeholders at the local level, too, to work with their state and regional counterparts to create a flexible framework for action that will complement what is done at the national level so progress can benefit all citizens.

We need to institute a system of accountability for actually making change instead of just talking about it. We need to hold our emergency response organizations and the individuals who represent them responsible for translating policy into action. We need to commit the right amount of resources to do the job of moving critically ill patients out of harm's way so that our country's first responders can write better, more specific emergency response plans. Are we going to allow our sickest, weakest patients to die outdoors on the tarmac in the summer's sweltering heat while waiting on a transport plane to move them? The answer should be "Absolutely not!" This is the United States of America—there is no excuse for not dedicating the full power of our country's resources to provide timely, efficient and proper care for our own in their time of greatest need.

We can no longer be satisfied with the lack of coordination, inefficiency and duplication of effort that exists in managing our healthcare emergency response. We must standardize processes, plans, databases and forms. If this country's complex Medicare and Social Security programs can operate from a single database, then so can our national hospital emergency response actions.

How is it that complicated and ever-changing rules and regulations have prevented some hospitals—almost six years since Hurricane Katrina—from recovering and restoring their facilities? How is it that we can allow these same unwieldy rules and regulations to prevent our nation’s hospitals from obtaining timely access to available grant dollars that will provide them with the funding to harden their physical plants for the next storm? The dollars are often out there for the taking, but we need smart, courageous policymakers and politicians to take a stand and reduce the clumsy and tedious redundancies that severely slow our system of getting help to those who need it.

Post-Katrina experiences have hospitals so concerned about liability that when facing an impending hurricane, some of them are simply evacuating all of their patients and shutting their doors, leaving the post-storm burden of care to others. We have to determine a way to not only protect our healthcare providers from liability but also to reimburse them properly for the care they do provide during these critical times. We must find a way to relax the rules in appropriate ways to allow facilities to do the right thing in taking responsibility for their communities’ medical care, before, during and after a storm.

Finally, we need to make education of those who will be working in the trenches in our nation’s healthcare delivery system during an emergency a priority as well as a requirement. We need to properly fund those initiatives, provide the expertise and technology to make it accessible to the greatest number and continue to encourage innovation in this important area.

Let this be the time that we move away from the policies of the past and become more clever about how we approach the future. Let us put intelligent, independent leadership in place to help make deep, elemental and revolutionary change in realigning our systems and processes. Let our healthcare providers focus on offering high quality, necessary emergency

care for patients, as opposed to being mired in bureaucracy and paperwork.

Recommendations

Based on my experience and research, consideration should be given to the following six areas in order to make fundamental change. Here, I will address each one in turn, and provide recommendations for each.

Recommendation I: Implement a central policy to guide and assist healthcare institutions in times of crisis at the state and national levels.

Several hospital and healthcare experts explained that no overarching, centralized authority exists to assist hospitals' or healthcare providers' activities in times of crisis, especially when the emergency requires federal government involvement. Certainly, hospitals have plans and procedures and respond to local emergencies when the need arises. But when the crisis is so large as to require a disaster declaration, with state and federal intervention that calls for a regional, multi-agency response, things begin to go awry.

The United States, as well as state governments, depend upon numerous emergency response organizations and agencies—FEMA, National Disaster Medical System (NDMS), Department of Homeland Security (DHS), Department of Health and Human Services (DHHS), Disaster Mortuary Operational Response Team (DMORT), Disaster Medical Assistance Team (DMAT), Veterans Administration (VA), Army, Navy, National Guard, American Red Cross, Emergency Transportation Operations, and many others—to help in a crisis. Each agency has a unique mission, with different ways of communicating, different protocols to follow, different people to whom they report, different paperwork and database systems—all of which make it harder for hospitals to effect timely decisions. Coordination of these agencies can pose any number of issues, with no one individual or organization taking charge of resolving them.

Respondents in my research study explained that frequent employee turnover at the agency level exacerbates an already challenging coordination issue. Hospitals may work for months with one team who is assisting in mitigation work, when, without warning, another team takes over. There is often no coordination between the old and new teams, especially where record-keeping is concerned, with the new team asking for copies of documents that were already provided to the previous team. Similarly, policies and procedures in place one day under one individual's supervision may change on a different day under a different leader, generating organizational instability and confusion. FEMA itself acknowledges its own shortcomings. For example, according to the current FEMA inspector general,

FEMA faces numerous challenges in measuring the effectiveness of its efforts to enhance individual and community preparedness (Adams, 2010, ¶ 2). Specifically, FEMA should improve coordination at state and local levels, update its information technology systems, hire experienced employees, and obtain funding necessary to meet the costs of disaster as well as training agency staff (Adams, 2010, ¶ 2). Retaining senior staff remains a central concern, as FEMA loses many top officials to other federal agencies (Adams, 2010, ¶ 3). In light of FEMA's increased involvement in routine disasters, coupled with the recent economic downturn, which has resulted in some state and local governments reducing their emergency management funding, we remain concerned about whether FEMA has sufficient staff focused on planning and preparedness efforts (Adams, 2010, ¶ 4).

Another observation has been that the person, or people, in charge of a particular government agency or unit at the time have more power than the policy in place to guide action. That person's politics and/or interpretation of what needs to be done sometimes takes precedence over policies that were designed and written to direct a situation.

Making matters even more difficult when time is of the essence, computer and database systems do not interface with one another and definitions of terms are incongruent, creating additional difficulties in keeping track of data and information and making requests for specific types of assistance. For example, how one agency defines a "critical" patient may

be much different than another agency's viewpoint. Another example of an issue, seemingly minor, that threw up a red flag was when one state was in the midst of evacuating patients prior to a hurricane's landfall. There was confusion on the ground when it was discovered that the patient manifest spreadsheets provided by the state were incompatible with the military branch's records of patients they would be transporting. These are the types of issues can cause delays that impact the delivery of patient care.

From the interviews I conducted, it appears that those responsible for initiating and establishing policy at the upper levels of state and federal government, are without backgrounds or experience in healthcare. Yet, decisions they make have a direct affect on patients and healthcare providers before, during and after emergency situations. Decisions made without input or representation from the healthcare community can create inefficiencies, miscommunication, rework and significantly increased costs. Some of the recovery suggestions made to a coastal hospital by one agency in the aftermath of Hurricane Katrina were absolutely without merit, making it plainly obvious that that agency's personnel on the ground clearly had no healthcare expertise.

For these reasons, I believe that we should consider bringing responsibility for providing governmental emergency medical care, guidance and resources under one centralized function.

The current mission of the Office of the Assistant Secretary for Preparedness and Response (ASPR), created post-Katrina, is to

Lead the nation in preventing, preparing for, and responding to the adverse health effects of public health emergencies and disasters. ASPR focuses on preparedness planning and response; building federal emergency medical operational capabilities; countermeasures research, advance development and procurement; and grants to strengthen the capabilities of hospitals and health care systems in public health emergencies and medical disasters. The office provides federal support, including

medical professionals through ASPR's National Disaster Medical System (NDMS) to augment state and local capabilities during an emergency or disaster (<http://www.phe.gov/about/aspr/Pages/default.aspx>).

The mission of NDMS is to temporarily supplement Federal, Tribal, State and Local capabilities by funding, organizing, training, equipping, deploying and sustaining a specialized and focused range of public health medical capabilities (<http://www.phe.gov/preparedness/responders/ndms/Pages/default.aspx>).

In my opinion, it would be beneficial to pull all of the health-related emergency response organizations and agencies under the auspices of the ASPR and have this office permanently direct all healthcare-related activities during a disaster. This agency can then be the conduit through which hospitals and healthcare providers obtain aid and assistance, particularly when evacuation is necessary due to an incoming hurricane. They can serve as the centralized government entity that provides directives and monitors compliance for the nation's hospitals overall but especially to those coastal facilities that frequently find themselves in need during hurricane season each June through November. Having said this, the Office of the ASPR must be provided with the requisite authority to not only coordinate action but to demand action and to enforce that it is occurring among the various levels under their auspices.

Another aspect of response and recovery that should be considered is the number of assets the government can commit to an area affected by disaster. Consider for a moment, the responsibilities of various levels of government during a disaster.

Local governments are responsible for providing for the safety and security of citizens in advance of a disaster—developing emergency plans, determining evacuation routes and providing public transportation for those who can't self-evacuate, as well as establishing and stocking local shelters with supplies. State government is responsible for mobilizing the National Guard, pre-positioning assets and supplies, and setting up the state's emergency management functions. They are also in charge of requesting federal support through the formal disaster declaration process. The federal government is responsible for meeting those requests from the state—before, during and after a disaster. This includes

- providing logistical support for search and rescue,
- providing food, water and ice,
- establishing disaster centers and processing federal disaster claims, and
- participating in short- and long-term public works projects, such as debris removal and infrastructure rebuilding (http://www.dhs.gov/files/gc_1224786766297.shtm).

When facing a hurricane threat, the decision to evacuate is usually made within a 48- to 72-hour window of time. In the event full evacuation of a coastal area is required, hospitals will require federal assistance. Given that, it is critical that enough federal personnel and transportation assets be made available to move and support a large number of critically ill patients successfully to a safe region who can accept them. According to sources for this study, currently the government has not yet dedicated, in writing, enough personnel or transportation assets to coordinate such an undertaking in a timely fashion (e.g., before a hurricane makes landfall).

Through my study, it has emerged that the federal government has committed to moving only 150 patients per day if an evacuation of a coastal city is required. Consider that the order for evacuation often does not occur until 48-72 hours out from an impending storm. At the very least, that means moving 300 patients and at the most 450. Are we to believe that the U.S. government is capable of only this? Surely we can move more than 450 people in a three-day timeframe. Planes at airports in major coastal cities like New Orleans and Houston are moving far greater numbers of people in an hour's time. As it currently stands, there is not even confirmation of what the government will do in writing. How can hospitals plan properly when they have no idea how many people they will be able to move? And moving weakened, critically ill patients is not like moving troops or furniture. This is a risky, highly complicated job, requiring a number of skilled medical personnel as well as sophisticated

medical equipment. For example, moving a neonatal intensive care infant requires at least one specialized nurse and the capability of moving an isolette and other complex lifesaving technology weighing some five to seven hundred pounds.

I am suggesting that we should make confirmation of federal assets a priority so that everyone involved—hospital leadership and those responsible for carrying out the task—can plan appropriately and patient care becomes the foremost concern.

Potential Solutions:

- Bring people together who have the authority to create, approve and implement an overarching policy to help healthcare providers in an emergency, disaster or crisis situation. People who can actually solve the current problem of a system that is too decentralized. Ensure that the policy is transparent, unambiguous and easy to interpret.
- Consider making the office of the ASPR responsible for all healthcare-related emergency medical response in an emergency.
- At the very least, hire people with healthcare experience to consult with agencies, such as FEMA, to make certain that providers' needs are clearly and firmly represented. Consider hiring healthcare administrative retirees who have years of experience working in hospitals as consultants. These individuals have a wealth of knowledge to share, and many of them have disaster training and/or experience as well.
- Reduce employee turnover that leads to confusion and costly delays.

Recommendation II: Instill a system of accountability, such that recommended after-action changes are funded, staffed and implemented following a major disaster.

Following Hurricane Katrina, numerous government and agency reports were published, encompassing the results of after-action meetings all with the purpose of making improvements so we could avoid a catastrophic episode like Katrina from ever happening again. Many good ideas were voiced and included in after-action reports, but sometimes these ideas were not translated into action. I heard more than a few stories of people on the ground who were desperately trying to act but could not because someone else had not done what they were supposed to do and no one was held accountable when work was second-rate—in other words, mediocrity is and was tolerated. Who is responsible for holding others accountable?

We demanded change after Katrina. Who is making sure that change continues to occur?

According to one of my research respondents, the government said they would have planes on the ground at a particular time to pick up patients being evacuated out and away from an incoming storm, but those planes did not show up until hours later, putting a significant number of already-compromised patients at further risk. Who is held accountable?

When those same patient evacuees were moved to safety, with family members desperate to know their loved ones' destination, who is held accountable when another government agency fails to maintain contact with hundreds of these patients? Who is responsible for letting families know of their whereabouts?

At the very least, we should consider publishing annually and publicly, similar follow-up reports on what has been done, what has been spent and what work is still yet to be completed so that the people of the nation understand what has been accomplished and have confidence in our abilities to respond to disasters.

Hospitals are operating with very constrained financial resources and overcrowded Emergency Department facilities today. According to one of my research respondents, many hospitals today are making barely enough money to cover their operating costs. What will happen to these hospitals when a disaster occurs? Those who already are struggling with capacity issues could be stressed well beyond their abilities in a crisis that creates a mass surge of patients. Healthcare facilities are bearing more of the burden of care, more liability for it, with less financial incentive to do so. According to one respondent, hospitals in his coastal state have been cut by double digits on their Medicaid reimbursement, which already was not covering the cost of care. On the Medicaid program alone, hospitals in this state are at pre-1994 Medicaid reimbursement levels, with almost half of the hospitals operating at a negative

margin on their financial statements. A hospital's "healthy" financial margins are what fund emergency preparedness improvements—as well as all of the other continuous upgrades a hospital must make in equipment and technology.

We must seriously consider funding emergency preparedness initiatives and assets for healthcare in general and for hospitals specifically to assist them in covering the costs of the investments they must make in emergency preparedness. When the government does provide funding in the form of grants, we must make it easier for hospitals to obtain these funds in a more timely manner. As the graphs in Chapter 2 of this dissertation depicted, the number of natural disasters and the populations affected by them are only increasing, as was confirmed in the spring of 2011 with tornadoes that ripped through the southern and mid-western portions of the United States, not to mention the earthquakes and tsunami that decimated the island of Japan in March 2011. Our nation's hospitals want to be ready to heed the call when it inevitably comes.

Potential Solutions:

- Increase accountability among those responsible for seeing that after-action plans are translated into just that—action.
- Increase funding to hospitals already severely impacted by a lagging economy and higher levels of uncompensated care, so that they may invest appropriately in meeting their goals for emergency preparedness and are ready when the need arises.
- Ask for input and feedback from healthcare providers, state hospital associations and other relevant parties as to what can be done specifically to increase action and accountability on their behalf where responding to emergencies is concerned.
- Create an online blog or listserv, sponsored perhaps by either The Joint Commission or American Hospital Association, where member hospital personnel can login and make password-protected posts of tips and lessons learned from their experiences in managing crises and disasters in their facilities and communities.

Recommendation III: Standardize plans, procedures, databases, forms, etc. to ensure consistency and efficiency among multiple agencies and institutions.

Numerous times during my interviews with key hospital leaders, I heard that bureaucratic requirements, red tape and lack of standardized reporting mechanisms, terminology, databases, forms, communication and rule sets were all adversely impacting the ability to assist healthcare providers in an emergency. I heard that local, state and federal plans and activities are still not being coordinated as well as they could be, creating delays and adverse implications for the most important item in the mix—the patient. If only there could be consensus regarding definition of terminology and basic information capture, much-improved patient tracking, efficiency and reporting would follow.

Again, here is where a centralized healthcare responsibility, like the office of the ASPR suggested previously, would be of benefit. This agency could take charge of implementing a standardization plan that would bring everyone together on a common platform for everything from data management to grant applications. Hospitals could continue to operate using their internally created plans at the local level and when a disaster situation exceeded their abilities and resources, then ASPR would be deployed to help.

Another problem respondents cited was that a lot of time is spent creating proprietary database systems locally, which are not compatible with what the government uses. Why not work together to create a single database that meets the fundamental needs of all those who will use it? It will make data reporting and access much easier, as well as these tasks, e. g., assessing hospitals' readiness in terms of supplies, fuel, food and water, census and bed availability and tracking patients. If Federal Express (FedEx) and the United Parcel Service (UPS) can do it, certainly the government can assemble individuals who can work with hospitals to create a dynamic database to combine data management and patient tracking

modalities.

Finally, one state has standardized its hospitals' emergency operations plans (EOPs). I am personally supportive of doing this. Every healthcare facility in that state knows what the other healthcare facilities are doing, so there is a level of familiarity that exists across regions and facility types. It would be interesting to study this situation further to determine if it has been beneficial for the state's healthcare institutions as far as interoperability, response and reporting is concerned.

Potential Solutions:

- Investigate the possibility of a national database, similar to EMSTAT, that will monitor individual hospital's readiness levels as well as assist in patient tracking. Enlist assistance from successful private sector companies, e.g., FedEx and UPS, to facilitate creation of the database.
- Consider standardized emergency operations plans for state hospitals to increase knowledge and understanding, as well as to increase adoption of innovative and best practices.
- Create standardized forms across agencies and agree upon standardized rule sets and terminology that will aid in understanding across the board and improve response and recovery times.

Recommendation IV: Relax bureaucratic rules and regulations that create added liability, paperwork and rework for healthcare institutions during and after emergencies.

Rules and regulations regarding caring for patients in an emergency situation have become so onerous that those who are in a position to take care of patients are afraid to act to do so.

Hurricane Katrina and other disasters have created a litigious environment for all of those providing aid during times of crisis, from shelter operators to hospitals. Everyone is fearful of being sued for doing too much or too little. Hospitals can face lawsuits for sheltering patients in-place and putting them at risk within the facility just as they can be sued for moving a critically ill patient to safer ground in the face of an impending disaster.

Ideally, most hospitals would rather shelter-in-place if they knew their infrastructure would make it through the storm and that they could obtain access to needed supplies in the aftermath. But fear of not being able to do so and the liability of having patients in-house in an untenable situation strengthens the case for moving patients to an alternate location.

For Hurricane Gustav, Louisiana hospitals were not evacuating their healthy patients so much as they were evacuating their sickest patients who were the least able to travel and at the most risk for developing complications in transit. Those patients became even more fragile during evacuation and some died as a result. Liability is, therefore, an enormous issue of great concern to healthcare providers.

More work can and should be done to protect hospitals, nurses, physicians, other healthcare professionals and first responders who are acting in the best interests of the patients during a crisis. While patients need protection and have a right to expect a certain standard of care, healthcare providers also need legal protection when taking action to help others in crisis circumstances.

As previously stated, the formality and tediousness of the rules and regulations created by government agencies, as well as personnel turnover in those agencies, have made it increasingly difficult for hospitals to accomplish even the most rudimentary tasks before, during and after a disaster or emergency situation. For example, it emerged during my research that representatives of one government agency worked with a hospital trying to restore its physical plant post-Katrina. These representatives collaborated with hospital staff and architects over a period of time, and approved the plans. Then the team changed. The next team did not approve the hospital's architectural drawings—drawings that cost \$250,000. Although the agency eventually paid for the unused, discarded plans, it was not without a

struggle not to mention the opportunity costs of lost time, hospital and staff resources and quality patient care.

Several of the administrators I interviewed advised that hospitals should become familiar with “the process” of working with governmental agencies after a disaster, getting a general idea of what the requirements are now so you can avoid hassles later. In particular, study what you can get reimbursed for and how and know those items for which you will not be eligible to receive reimbursement.

One respondent explained that even though it is more than five years post-Katrina, FEMA is still asking for documentation from purchase orders the hospital issued four years ago. FEMA wants to know who did the work, what the individual’s skill level was and how many hours he spent on particular aspects of the job. More than one hospital representative I spoke to has had to add at least one staff member to keep up with the infinitesimal details of FEMA’s project worksheets. A respondent said that the Office of the Inspector General (OIG) can audit a hospital five to eight years after it has completed its mitigation work, so hospitals must document carefully everything they do and keep meticulous records. The OIG can even take back money they have awarded a hospital. One hospital representative told me the OIG took a half million dollars back from his facility after reviewing a project worksheet and deciding the hospital had been overpaid. This is why record-keeping is so important. In most institutions, if an auditor came in eight years later to dispute a claim, chances are a hospital would not remember it, nor would they be able to locate the documentation for it.

As one source put it, “there are lots and lots of hoops to jump through. You need to manage and keep everything and document everything in triplicate.” Working with the government is a time- and labor-intensive process. Rules change midstream or are added at

the last minute, substantially slowing a hospital's ability to recover. And all the while, the clock is ticking toward the next storm season or potential emergency.

Potential Solutions:

- Develop regulations and laws to provide guidance, assistance, and protection to healthcare providers who are struggling with making difficult patient-care decisions in a highly litigious environment while operating in extremely stressful circumstances.
- Improve transition/handoff procedures between personnel of key government agencies and staff of hospitals who are trying to get back on their feet post-disaster. If and when agency staff change during a hospital mitigation project, ensure that the plan approved by the initial on-site team remains unchanged and moves forward according to previous approvals.
- Hire agency representatives who have knowledge of the healthcare industry and the provision of healthcare to decrease the amount of rework hospitals must do in an effort to resume operations post-disaster.
- Remove redundant procedures and administrative red tape where getting help is concerned. Simplify processes and ways to obtain the right information the first time. Decrease the amount of recordkeeping required.
- Referring to a previous recommendation, for records that must be maintained, use a singular database in which to collect recovery-related data and information so that it is accessible and retrievable by government representatives, hospital staff and others who need it, when they need it.

Recommendation V: Incentivize healthcare institutions and facilities to do more during and after a disaster by reimbursing them fairly for care they provide.

According to the National Disaster Management System (NDMS) website,

...accredited hospitals, usually over 100 beds in size and located in large U.S. metropolitan areas, are encouraged to enter into a voluntary agreement with NDMS. Hospitals agree to commit a number of their acute care beds, subject to availability, for NDMS patients. Because this is a completely voluntary program, hospitals may, upon activation of the system, provide more or fewer beds than the number committed in the agreement. Hospitals that admit NDMS patients are guaranteed reimbursement at 110% of Medicare rates by the Federal government (<http://www.phe.gov/Preparedness/responders/ndms/Pages/default.aspx>).

However, experience has shown that those hospitals who are willing to voluntarily become a member of NDMS and accept patients evacuating from an affected geographic region are sometimes not reimbursed for the patient care expenses that they have incurred.

This was the case after Gustav when hospitals in one southern state were left uncompensated for millions of dollars of services they provided to patients fleeing the hurricane. While great efforts were made to obtain reimbursement for those hospitals, those efforts ultimately were unsuccessful. This creates a situation where hospitals will not participate in NDMS, potentially requiring evacuating patients to be transported much further, thereby increasing risk to the patient.

Instead of making it more difficult for hospitals to render aid and assistance in these circumstances, we should be making it advantageous for them to accept evacuees and to receive compensation for their care. Why would a hospital that already is fighting for its fiscal life agree to take the financial and legal responsibility for evacuating patients when they know they will not receive funds to even cover their costs?

Many hospitals have taken a financial blow due to the United States' present distressed economy. Several cannot even afford the minimal matching funds necessary to obtain grant money offered by the government. For example, a hospital may be able to get money to help pay for generators or personal protective equipment as long as the hospital is able to pay for a portion of the cost—let's say the hospital puts up 5% and the government picks up the remaining 95% of the cost. Many hospitals simply don't have that 5% to give, so they lose all of the free funds available to them.

One respondent told me that both money and human resources are going to continue to be a challenge for healthcare providers, particularly with looming healthcare reform measures. This respondent spoke of hospitals that already are reducing staffs and services just to stay financially viable. Lack of money is not going to enhance any hospital's emergency preparedness posture, and hospitals are not going to offer to do anything they cannot be

reimbursed for in this tough economic climate.

Also, it is difficult for certain categories of special needs patients to obtain medical care, specifically, those dependent on oxygen as well as those requiring renal dialysis. According to sources used in this study, hospitals do not provide outpatient dialysis because the methodology used for reimbursement is much different than for inpatient dialysis, preventing them from doing so. Many hospitals do offer inpatient dialysis as provided by private contractors. The independent, free-standing dialysis centers that provide outpatient dialysis services often shut their operations down during a disaster due to the lack of power and/or water. It would, therefore, be propitious to seek an alternative way of providing a waiver program for hospitals to be compensated for providing outpatient dialysis services on an emergency basis. Additionally, it makes sense to provide dialysis resources to those who need them in the form of portable dialysis units established within regionally located special needs shelters. These patients could go there to obtain needed dialyzing, assisting these patients in obtaining help for their chronic condition.

Oxygen supplies were also of great concern during recent Gulf Coast storms. As storms approached, durable medical equipment (DME) providers closed due to lack of power and to heed evacuation directives from local officials. This left many oxygen-dependent patients unable to secure an adequate supply of oxygen to sustain them throughout the emergency. We must tackle this problem, which has become a significant issue not only in coastal states, but throughout the nation when weather-related emergencies affect power supplies, etc.

Why not create a system where patients can sign for and easily obtain critically needed oxygen cylinders, as well as a way for cylinders to be returned? Surely we can design a

method of distribution where patients go to convenient, centralized locations—drug stores or public health clinics—to make a cash deposit based on the number of cylinders they obtain.

When the emergency is over, patients return the cylinders and obtain a portion of their deposit back.

Potential Solutions:

- Investigate what is occurring with NDMS as far as compensating member hospitals for services provided. In this economy particularly, hospitals have to be confident that they will receive compensation for services they are rendering to assist others in an emergency.
- Consider establishing an emergency hospital waiver for the provision of outpatient dialysis services. This will help to improve accessibility to this service for which there is great demand but few providers.
- Offer portable dialysis services in special needs shelters when these are opened due to an imminent storm or crisis situation.
- Establish a system of distributing oxygen cylinders and having them returned to improve service and reduce associated costs.

Recommendation VI: Assure that more healthcare personnel—physicians, nurses, administrators and allied health professionals—receive appropriate, current training in NIMS/HICS and emergency planning and preparedness, pre- and post-event.

Nursing and medical school curricula, as well as dental schools, hospital executive programs and allied health professional programs must incorporate and require emergency preparedness training for incoming students. As well, current, working professionals must receive the latest available information, guidelines and updates on best practices.

Technology has made it much easier to provide this information through teleconferencing and online webinars, in addition to any on-site training that may include tabletop scenarios or more realistic, lifelike exercises. The American Medical Association (AMA) provides such training, and the numbers of those who have availed themselves of their programming is increasing. We must ensure that practitioners continue to obtain this valuable preparation and instruction to keep raising the bar of innovation for emergency medical

preparedness and response.

The South is the perfect location to consider launching a Center for the Study of Healthcare Emergency Preparedness and Response in conjunction with one of our medical schools. With significant experiences in preparing and responding to hurricanes, tornadoes, floods, chemical and oil spills, experts in the South are uniquely primed and equipped to act as a significant and tested resource of knowledge in this regard. Certainly, we can act as an exemplar for the nation's healthcare providers on best practices that have been put to the ultimate test.

Potential Solutions:

- Include emergency preparedness and response training in medical schools, nursing schools and schools of allied health to ensure that these upcoming healthcare professionals are able to act once they are licensed and practicing. Make emergency preparedness and response part of their board examinations.
- Similarly, ensure that current, working healthcare administrators, doctors, nurses and allied health professionals receive adequate training in emergency preparedness and response and that renewal of their licensure takes this continuing education into account.
- Consider creating a national center for the study of healthcare emergency preparedness and response that can be the premier source of cutting-edge expertise and best practices in the field today.

Conclusions

The storms of 2005 and 2008 along the U.S. Gulf of Mexico coastline caused significant damage, destruction and human suffering. They also revealed tremendous gaps in our country's ability to respond effectively to disasters of this nature. This study sought to determine what progress healthcare providers in the Gulf Coast region had made during the past five years in terms of their ability to sustain operations at a higher level during the next crisis or emergency situation.

Through this study, I met numerous healthcare workers and administrators—all

committed and dedicated to their profession and passionate about making improvements that will enable them to continue to provide the highest quality of care to the patients they serve. I discovered a healthcare workforce characterized by teamwork and an innovative, can-do spirit, willing to serve in any capacity to get the job done. I was repeatedly struck by the flexibility and improvisational nature of the employees I spoke to in regard to what they accomplished in preparation for and reaction to recent hurricane disasters. Their incredible stories are an inspiration.

In conclusion, this study shows that we can never let down our guard. Healthcare providers must remain vigilant against crisis and disaster and refuse to be complacent no matter what the cost. Work must continue to improve our policies and processes, streamlining and reorganizing them for efficacy and ease of use—at the local, regional and federal levels. Standardization of plans, procedures, databases and forms must happen so that response organizations can act swiftly, efficiently and consistently. We must invest in the tools and technology that will allow our nation's healthcare providers to operate as seamlessly as possible during a crisis.

We must seek to reduce bureaucracy and paperwork and help to eliminate the fear of retribution created by our litigious society that prevents many of our healthcare institutions from being proactive in an emergency. We must also see that hospitals are reimbursed fairly for care they provide during an emergency, whether at the home institution or at a remote hospital which has agreed to accept another facility's patients during time of disaster.

We must ensure that we have strong, able, accountable leaders at the highest levels in response organizations like FEMA and the Office of the ASPR who will support the nation's healthcare providers with materials, equipment and knowledgeable staff who can assist them

in their time of greatest need. Hospitals must continue to play a strong role in their local communities but must also look beyond the borders of their cities and states to collaborate and seek partnerships with others to whom they can turn for help in the event of a mass casualty disaster.

Educating our nation's existing healthcare workers at all levels must continue at a higher pace and must become a part of the curricula of students in the medical, nursing and allied health professions. These are the employees who will be leading us into the future of emergency and crisis preparedness planning and implementation.

Hospitals are at the epicenter of our communities. They are there for us 365 days a year, 24 hours a day. They contribute to the health and welfare of our nation's citizens around the clock, from the smallest neighborhoods to the largest cities. We must pledge our most fervent support for our healthcare providers—those vitally important resources and places of safe haven and refuge upon which we all rely in our times of greatest need.

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VITA

Holly Houk Cullen was born May 12, 1961, in New Orleans, Louisiana, to Mary Margaret Suchand Houk and the late Louis Scheffer Houk, Sr., and is the eldest of their four children, including brothers Louis (Chip), Scott and Lawrence (Larry) Houk.

Holly attended St. Andrew the Apostle elementary school and Benjamin Franklin Senior High School in New Orleans. She earned a Bachelor of Arts in Journalism degree with an emphasis in advertising in spring of 1983 from Louisiana State University. In fall of 2000, she earned a Master of Business Administration degree with honors from Nicholls State University in Thibodaux, Louisiana, and was selected 2000 MBA Student of the Year. Her area of specialization is marketing and public relations (PR).

In 2005, Holly became accredited in public relations (APR) by the Public Relations Society of America (PRSA) and its Universal Accreditation Board. The Public Relations Association of Louisiana's Baton Rouge chapter (PRAL) named her Practitioner of the Year in 2005. In 2008, she was selected as the recipient of PRAL's First Circle Award, the highest honor bestowed by the organization. In 2011, Holly was selected as PRAL's statewide nominee for the Professional Achievement Award sponsored by the Southern Public Relations Federation (SPRF), an organization representing public relations professionals in Louisiana, Mississippi, Alabama and Florida. Holly will graduate from Louisiana State University and Agricultural and Mechanical College with the degree of Doctor of Philosophy in December 2011.

Holly has been a PR professional for nearly 30 years, with experience in both healthcare administration and higher education marketing and PR. For the first half of her career, Holly worked in the healthcare industry, in PR positions in hospitals in New Orleans and Thibodaux, Louisiana. Her most recent post before joining LSU was as Marketing Director for Thibodaux

Regional Medical Center, where she spent 10 years. Her experiences there helped to provide a springboard for her move to LSU, where she currently serves as Assistant Vice Chancellor of University Relations.

Throughout her career, Holly has volunteered in several community organizations, most notably, the Susan G. Komen Foundation, American Diabetes Association, the American Red Cross, and Thibodaux Chamber of Commerce. She has held volunteer leadership positions in PRAL, the Louisiana Society for Healthcare Public Relations and Marketing and the Council for the Advancement and Support of Education (CASE). She is an active member in both PRAL and CASE (District IV), in addition to being a member of Phi Kappa Phi and Beta Gamma Sigma honor societies.

Holly currently resides in Baton Rouge, Louisiana, with her husband of six years, Ray Cullen, and their delightfully rambunctious yellow Labrador retriever, Duke.