The Impact of Hurricane Katrina on the Medical and Healthcare Infrastructure: A Focus on Disaster Preparedness, Response, and Resiliency

Havidán Rodríguez
Benigno E. Aguirre

Disaster Research Center (DRC)
University of Delaware

The Dynamics of Societal Resilience Small Group Meeting
Australian Government, Department of Defence
Defence Science and Technology Organisation
University House, Australian National University
Canberra, Australia, May 22nd – 23rd, 2006

Talking Points

- General impact of Hurricane Katrina
- Hurricane Katrina's impact on the healthcare infrastructure
- Healthcare infrastructure post-Katrina
- Conceptualizing resilience
- Hospitals and resiliency
- Enhancing resiliency in a post-Katrina environment
- Remaining Challenges to the Development of a Resilient System

Katrina's Impact

- Most destructive "natural" disaster in U.S. history
- Impacted about 90,000 square miles
- Death toll estimated at about 1,300
- Displacement of over two million people
- "Refugees" scattered throughout the continental United States; over 200,000 displaced persons to evacuation centers in at least 18 states
- About 350,000 houses destroyed
- Economic impact will surpass $100 billion

Katrina's Impact

- Cutter, et al. (2006:10) indicate that Katrina exposed the coastal populations of Louisiana and Mississippi to "an unprecedented combination of natural forces and human failures."

Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

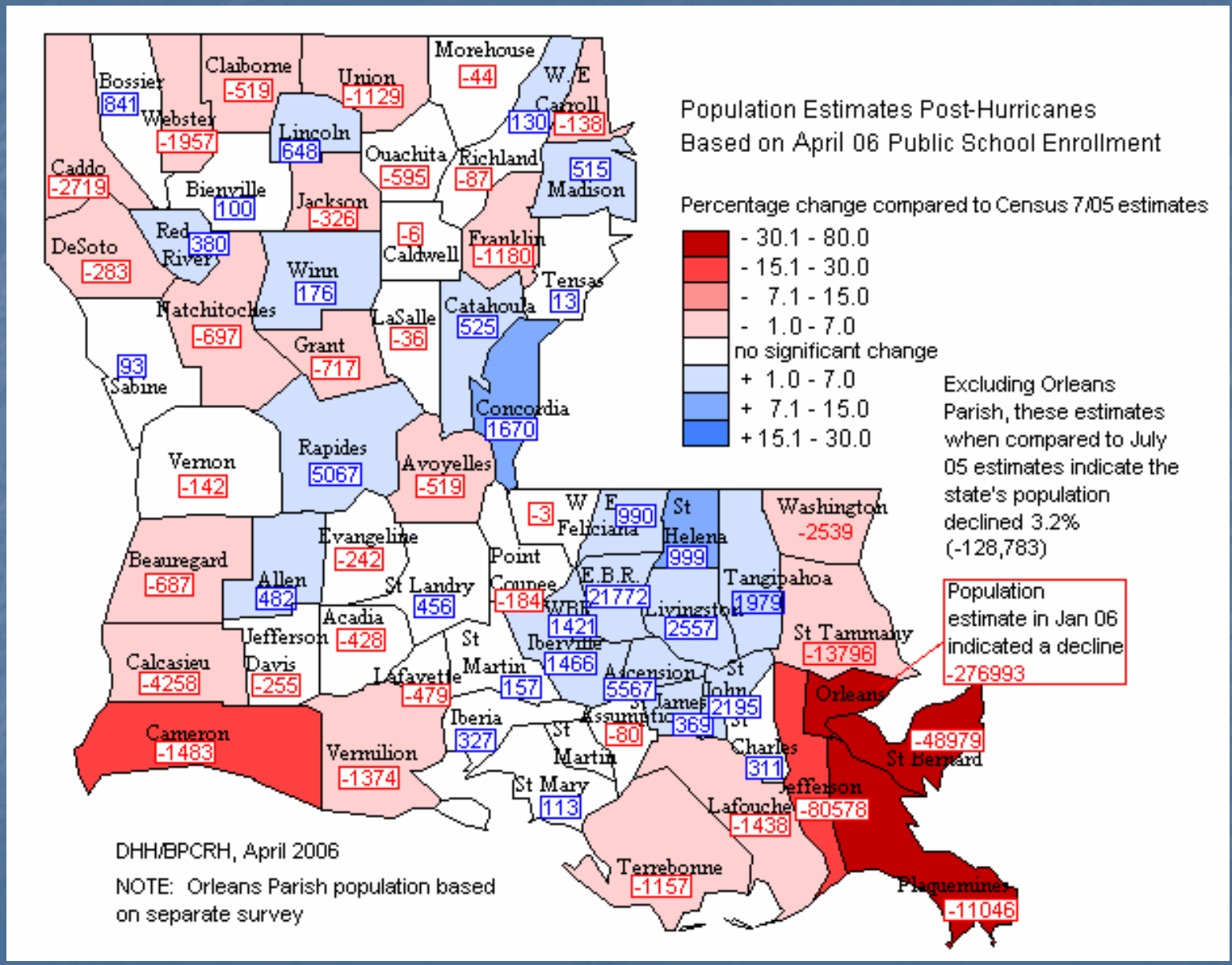
Katrina's Impact

Source: DRC, 2005

Katrina's Impact

Source: DRC, 2005

Katrina's Impact: Population Loss in Louisiana



Source: http://www.gnocdc.org/

Katrina's Impact on the Healthcare Infrastructure

- The healthcare infrastructure and services in New Orleans, already ranked as among the poorest in the nation, were all but decimated by Hurricane Katrina
- Katrina and the ensuing flooding impacted an already frail and vulnerable healthcare infrastructure

Katrina's Impact on the Healthcare Infrastructure

- As a consequence of Katrina and the levee breach in New Orleans:
  - Basements were flooded
  - Medications, food, equipment, and supplies were partially or completely lost
  - The mechanical, plumbing, and electrical systems were all but destroyed
  - Hospitals ran out of fuel to power their generators

Katrina's Impact on the Healthcare Infrastructure

- For many hospitals there was no electricity or running water; sewage system was inoperable; communication systems rendered useless
- Hospitals had to ration food for their patients, hospital staff, and others who converged at their facilities
- Problems were exacerbated by the number of additional patients for which hospitals had to provide healthcare and by other individuals seeking temporary shelter

Impact on the Communication Infrastructure

- "During Hurricane Katrina, the destruction of communications systems left hospital and nursing home administrators unable to receive basic information, such as when assistance would arrive*."

*U.S. Government Accountability Office (GAO). www.gao.gov/cgi-bin/getrpt?GAO-06-443R (2006:14)

*Also see: Rodriguez, H. and Aguirre, B.E. (Forthcoming, 2006). "The Impact of Hurricane Katrina on the Medical and Health Care Infrastructure: A Focus on Disaster Preparedness, Response, and Resiliency." FRONTIERS of Health Services Management.

The Healthcare Infrastructure: Post-Katrina

- 8 out of the 16 hospitals in the New Orleans area were closed, some permanently
- About 2,000 (57%) of the 3,500 practicing doctors were displaced
- The healthcare system in New Orleans is fragile; “running on life support ”
- Available healthcare resources and services are insufficient to cope with the medical needs and demands of the current population, not to mention the pre-Katrina population in the region.

Conceptualizing Resilience

- A multi-dimensional and never ending process that incorporates a host of factors, including:
  - Past experiences, imagination, creativity or improvisation (and even luck!)
- Ability to “bounce back” and continue to function
- Ability to cope and recover from the impact of the hazard event
- A system’s capability to effectively absorb, respond, and recover from an internally or externally induced set of extraordinary demands

Conceptualizing Resilience

- Development of a collective and shared vision of dangers and what to do about them; allows for the constant monitoring of threatening contextual conditions.
- Incorporates both an awareness of potential hazards and their physical, biological, psychological, social, and cultural demands, and the taking of action in anticipation of these demands to minimize their effects

Conceptualizing Resilience

- Requires a paradigm shift to a more holistic, integrated, and collective approach aimed at enhancing safety and security
- Resiliency is a function of raising awareness, and conscious planning and training
- Building resiliency is about capacity building and generating adaptability

Conceptualizing Resilience

- Understanding Resilience in the context of vulnerability: must focus on a vulnerability-resiliency paradigm
- Many factors contribute to our understanding of vulnerability and resilience (see Cutter, et al. 2006:11):
  - Access to resources and political power
  - Social capital and social networks
  - Beliefs, culture and customs
  - Socio-economic and demographic characteristics
  - Special needs population (elderly, chronic illness, etc.)
  - Type, construction materials, and age of buildings
  - Type and density of infrastructure and lifelines

Conceptualizing Resilience

- The challenge for the incorporation of resiliency:
  - Identify what factors enhance the ability of organizations to effectively rebound, considering the physical and social systems and the resources available to lessen vulnerability
- In essence: what can we do and what resources are available for the implementation of our plans?

Hospitals and Resiliency

- Hospitals are highly resilient organizations; they are in the business of handling emergencies, crises, and disasters
- They are autonomous and self-referential organizations, yet they are part of inter-organizational systems
- They change and orient their actions to accommodate the demands of the systems of cooperating agencies

Hospitals and Resiliency

- Demands generated by disasters disrupt the operations of hospitals but through adaptive mechanisms they gradually become routine programs and practices
- Hospital staff experience and anticipate these disruptions; they become part of their imagined reality; anticipatory planning and corrective actions are taken
- Over time, the strengthening of hospitals comes about as these extraordinary demands become routine events: Hospitals become resilient organizations

The Aftermath of Katrina: Challenging the Resiliency of Hospitals

- What happened during the aftermath of Katrina that overwhelmed hospitals?
  - The magnitude of the events
  - Hospitals dealt fairly well with Katrina but the impact of the levee breakdown was unanticipated
  - Disruption of external systems supplying many of the hospitals in the region with key services and resources
  - Increased number of patients, both present and expected, that required medical care

The Aftermath of Katrina: Challenging the Resiliency of Hospitals

- Convergence of a host of different people at hospitals
- The impact on the physical plants of the hospitals, challenging their functionality
- Inadequate local, state, and federal response and evacuation process
- Given this rare set of conditions, hospitals in the region were not resilient to Katrina's extraordinary set of demands

Enhancing Resiliency in a Post-Katrina Environment:
The New Orleans Commission

Diverse set of committees focusing on critical issues:

- Urban planning
- Education
- Infrastructure
- Culture
- The criminal justice system
- Public transit
- Economic development
- Health

Enhancing Resiliency in a Post-Katrina Environment: The New Orleans Commission

- The Health and Social Services Committee (2006) of the New Orleans Commission generated a report providing an extensive number of recommendations aimed at preparing hospitals for future disasters, with the goal of developing a sustainable and resilient healthcare system

Enhancing Resiliency of the Health Care System in a Post-Katrina Environment

- The Health and Social Services Committee (2006) recommendations:
  - Creation of community healthcare centers: serve all segments of the population and linked to hospitals in the region
  - Evacuation planning
  - Developing effective and resilient communication systems

Enhancing Resiliency of the Health Care System in a Post-Katrina Environment

- Creation of a system for transportable key health information for patients and disaster victims requiring medical treatment in other hospitals throughout the country
- Developing systems of care that are community driven and community based
- Generating databases with reliable and up-to-date demographic information to enhance hospital planning and decision making during crisis situations

Enhancing Resiliency of the Health Care System in a Post-Katrina Environment

- Developing effective communication and outreach strategies
- Ensuring that temporary shelters have the necessary facilities, staff, supplies, and equipment to provide adequate healthcare to all patients but particularly to those with special needs

Enhancing Resiliency of the Health Care System in a Post-Katrina Environment

- These changes are needed in order to develop an effective and resilient healthcare system and infrastructure
- They will provide adequate healthcare not only on a regular basis but also in times of crises and disasters

Enhancing Resiliency of the Healthcare System in a Post-Katrina Environment

- Development of a resilient healthcare infrastructure requires, among others:
  - Planning: Local, State, and Federal levels
  - Access to adequate resources
  - Networking; partnerships (e.g., Project Impact)
  - Effective communication and coordination
  - Training and education of doctors, nurses, technicians, and medical staff

Remaining Challenges to the Development of a Resilient System

- Limited funding to implement the recommendations of the New Orleans' Commission
- Prior to Katrina, medical system in Louisiana ranked as 49th in the country
- Extreme poverty in the region
- Technological medical advancements have resulted in new types of vulnerabilities

Remaining Challenges to the Development of a Resilient System

- Eight states in the Gulf Coast do not have the necessary equipment and resources for communications' interoperability for the 2006 hurricane season
- "Most public safety agencies in the Gulf remain unable to effectively communicate with one another both during "routine" emergencies and major disasters*."

*First Response Coalition. 2006. "The Imminent Storm 2006: Vulnerable Emergency Communications in Eight Hurricane Prone States." http://www.firstresponsecoalition.org/docs/Hurricane-Interop-Paper.pdf

For Additional Information

- Visit the DRC facilities at:
  - 87 E. Main Street, Newark, DE
  - (302) 831-6618
- Visit the DRC webpage:
  - www.udel.edu/DRC/